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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

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B. Bibliographic references to other items of interest to the profession.

C. Selective, annotated bibliographies on subjects of immediate and special interest to meteorologists.

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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

MALCOLM RIGBY, Editor

Vol. 1 NOVEMBER 1950 No. 11

SPECIAL FEATURE IN THIS ISSUE

A Selective Annotated Bibliography on Evaporation

(For complete table of contents see back cover)

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FOREWORD

Each issue of Meteorological Abstracts and Bibliography consists of four parts, as ca be seen in the table of contents on the back cover.

Part I comprises 100 to 200 classified and annotated references to current material in th field of *Meteorology* and other fields immediately applicable to *Meteorology*.

In addition, the first issue (Vol. 1, No. 1) contained a **Review of 30 Current Meteorologic Periodicals,** and the second issue a **Review of 15 Meteorological Periodicals which have lapse**

Part II of each issue provides a means of accumulating the important references on give subjects without respect to recency. It is impossible to make these bibliographies exhausti under present personnel, time and printing limitations; but every attempt is made to include representative cross section of the various aspects of each subject, some preference being give to recent material, comprehensive works, those from obscure sources and those with goo bibliographies.

Selective, annotated bibliographies consisting of from 50 to 300 items each, have be printed in the issues of Meteorological Abstracts and Bibliography, as follows:

(1) **Atmospheric Pollution,** Vol. 1, No. 1, Jan. 1950
(2) **Aerobiology,** Vol. 1, No. 2, Feb. 1950
(3) **Cloud Physics and "Rain Making,"** Vol. 1, No. 3, March 1950
(4) **Hail,** Vol. 1, No. 4, April 1950
(5) **Tornadoes,** Vol. 1, No. 5, May 1950
(6) **Volcanic Dust,** Vol. 1, No. 6, June 1950
(7) **Climatic Changes,** Vol. 1, No. 7, July 1950
(8) **Thunderstorms,** Vol. 1, No. 8, August 1950
(9) **Icing,** Vol. 1, No. 9, September 1950
(10) **Acoustical Propagation,** Vol. 1, No. 10, October 1950
(11) **Evaporation,** Vol. 1, No. 11, November 1950

Future issues will contain:

(1) **Extended Forecasting,** Vol. 2, No. 1, Jan. 1951
(2) **Long Range Forecasting,** Vol. 2, No. 2, Feb. 1951

Other bibliographies will be on: **Turbulence, Machine Methods in Meteorology, Objecti Forecasting, Radar and Radio Meteorology, Soil Temperatures** and **Nomograms and Co putation Tables.**

In Part III the contents of those journals which are primarily meteorological are liste and published in the earliest issue where space permits. These entries are not classified indexed.

Part IV consists of author, subject and geographical indexes. The subject and ge graphical indexes are made up, as a rule, from the subject headings which follow each entr

In the June and December issues *cumulative* author and subject indexes will be publishe

LIST OF PERIODICALS

Note: In this list the preferred form of title for entry is given in bold face type. If the title is distinctive, the name and headquarters of the issuing society or organization follows the title. If the title is not distinctive the issuing organization precedes and is part of the title.

ERIODICALS IN WHICH METEOROLOGICAL ARTICLES REGULARLY APPEAR

Akademiia Nauk, SSSR, Izvestiia, Ser. Geogr. i Geofiz., [Moscow].
American Geophysical Union, Transactions, National Research Council, Washington.
American Meteorological Society, Bulletin, [Boston].
Annalen der Meteorologie, Meteorologisches Amt für Nordwestdeutschland, Hamburg.
Annali di Geofisica, Istituto Nazionale di Geofisica, [Rome].
Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A and Ser. B, [Vienna].
Australian Journal of Scientific Research, Ser. A, Physical Sciences, [Melbourne].
Ciel et Terre, Société Belge d'Astronomie, de Météorologie et de Physique du Globe. Uccle-Bruxelles.
Geofisica Pura e Applicata, Istituto Geofisica Italiano, [Milan].
Geophysical Magazine, [Central Meteorological Observatory, Toyko].
Hemel en Dampkring, Nederlandse Vereniging voor Weer- en Sterrenkunde, [The Hague].
Idöjárás, Az Országos Meteorológiai és Földmágnességi Intézet, [Budapest].
Indian Journal of Meteorology and Geophysics, [Delhi].
Journal of Geophysical Research (formerly Terrestrial Magnetism and Atmospheric Electricity), [Washington].
Journal of Meteorology, American Meteorological Society, [Boston].
Journal Scientifique de la Météorologie, Société Météorologique de France, [Paris].
The Marine Observer, Air Ministry, Meteorological Office, London.
The Meteorological Magazine, Air Ministry, Meteorological Office, London.
Meteorological Society of Japan, Journal, Second Series, Kisho Shushi, [Tokyo].
Meteorologické Zprávy, Státní Meteorologický ústav v Praze, [Prague].
La Météorologie, Société Météorologique de France, [Paris].
Meteorologische Rundschau, Bad-Kissingen, [U. S. Zone, Germany].
Monthly Weather Review, U. S. Weather Bureau, Washington, D. C.
Nimbus, Sociedad Meteorológica de Bolivia, [La Paz].
Polarforschung, Archiv für Polarforschung in Kiel, [Kiel, British Zone, Germany].
Revista Meteorológica, Junta Nacional de Meteorología, Montevideo.
Rivista di Meteorologia Aeronautica, Associazione Culturale Aeronautica, [Rome].
Royal Meteorological Society, Quarterly Journal, [London].
Tellus, Svenska Geofysiska Föreningen, Stockholm.
Vsesoiuznoe Geograficheskoe Obshchestvo, SSSR, Izvestiia, [Moscow-Leningrad].
Weather, Royal Meteorological Society, [London].
Weather Development and Research Bulletin, Australia, Meteorological Branch, [Melbourne].
Weatherwise, Amateur Weathermen of America, Philadelphia.
Wetter und Leben, Österreichische Gesellschaft für Meteorologie, [Vienna].
Zeitschrift für Meteorologie, Meteorologisches Observatorium, Potsdam, [U. S. S. R. Zone, Germany].

★ Indicates those periodicals which are primarily meteorological.

EXPLANATIONS

Location of material: While it is physically impossible to give for each entry the name of eve library where that item might be obtained, it is possible, by using standard library symbols, to g the reader some idea of where he might obtain such material. So in most instances a symbol tak from the Union List of Serials (Gregory), or the Union Catalogue of the Library of Congress will given just before the text of each abstract. In some cases where no symbol has been assigned a library, one will be invented by using the general principle of the Union Catalogue list. As a r the library indicated will be in the District of Columbia, with an occasional reference to one in N York or Boston. It will be noted that D stands for District of Columbia, M for Massachusetts a N for New York. Thus **DWB** stands for the U. S. Weather Bureau Library in Washington, D. and **MH–BH** for the Blue Hill branch of the Harvard Library in Boston, Mass. In the latter ca since the Blue Hill Observatory contains not only the Harvard Observatory Library but that of t American Meteorological Society, the same symbol (**MH–BH**) will stand for either or both librari

Library symbols: The following abbreviations have been used for Libraries in which the spec material thus indicated in this issue is located:

DA:	U. S. Department of Agriculture Library, Washington, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DSI:	Smithsonian Institution Library, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.
MH:	Harvard University Library, Cambridge, Mass.
MH–BH:	Harvard University, Blue Hill Observatory (and American Meteorological Socie Library, Milton, Mass.

Geographical (place) names are in the form generally used internationally, rather than in the fo used locally. For instance Vienna is used instead of Wien, Florence for Firenza, Moscow for Mosk and Germany for Deutschland, etc.

Titles of articles or monographs are in the language of the original article unless otherwise stat Slavic (Cyrillic) titles are transliterated according to the Library of Congress transliteration sche into the Roman Alphabet.

Entries for **titles of periodicals** are given in the form used on the title page of the periodical provid the title is distinctive (Monthly Weather Review, Meteorologické Zprávy, and Revista Mete ológica). If the journal is the official organ of a society or institution and the title is not distinctiv as is the case with Transactions, Bulletins, Proceedings, Comptes Rendus, Trudy, Izvestiia, Sitzun berichte, Verhandelingen, Miscellanées, etc., the preferred name of the organization is given fi as part of the title (American Geophysical Union, Transactions; Royal Society of London, P ceedings).

Abbreviations and other symbols:

Titles of periodicals are not abbreviated as a rule. Other abbreviations will be used sparin and only when the abbreviation is obvious.

The months of the year from March through July are not abbreviated. Other months abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec., respectively.

The word or abbreviation for Volume, (Tom, Band, Jahrgang, Año, etc.) and for Num (Heft, Fascicule, Vypusk) and page or pages is omitted from most entries. Thus an entry will re as follows:

Meteorologische Rundschau 2(5/6):146–151, May/June 1949.

This indicates that the article was in the Meteorologische Rundschau, Jahrgang 2 (Vol. Heft 5/6 (No. 5 and 6), pages 146–151, Mai/Juni 1949.

The symbol * before an entry indicates a good data source.

The symbol † before an entry indicates a good bibliography source.

The symbol § indicates a synoptic case history study accompanied by charts.

PART I. ABSTRACTS OF CURRENT METEROLOGICAL MATERIAL

GENERAL METEOROLOGY

11–1 551.5(04)

Johansson, Osc. V., **Riktlinjer och problem för meteorologin i Finland, speciellt klimatrskningen.** [Basic features and problems of meteorology in Finland, particularly in climatic search.] *University of Helsinki, Institute of Meteorology, Papers*, No. 62, **1949.** 31 p. 4 fs., equation. (Reprint from *Bidrag till Kännedom af Finlands Natur och Folk*, Vol. 93, o. 3.) **MH-BH**—The farewell address given by the author at the University of Helsinki on lay 10, 1944, wherein he outlines a number of problems in meteorology and climatology hich he thinks need further research. The list of subjects covers practically the whole field meteorology, from the improvement of observatories and networks to specific research on mospheric electricity, cloud physics, etc. Among the important problems are: statistical udies on long period climatic records and on air masses and movements; phenological and icroclimatic studies; instrumental improvement; studies on the physics of snow and ice both the atmosphere and on the ground; and numerous other problems of dynamic and synoptic eteorology and climatology. *Subject Headings:* **Meteorological research, Addresses, nland.**—*M.R.*

11–2 551.5:06

J————, V. C., **Summer meeting.** *Weather*, 5(8):270–272, Aug. **1950. MH-BH**—rief account of visit of Royal Meteorological Society to Central Forecasting Office, Dunstable. *ubject Heading:* **Royal Meteorological Society.**

11–3 551.5:06(492)

Hauer, A., **The Royal Netherlands Meteorological Institute during and after the last war.** *Veather*, 5(9):305–306, Sept. 1950. plate. **DWB**—Describes difficulties during the occupaon and post-war reorganization under Dr. Vening Meinesz. *Subject Headings:* **Meteorological ganizations, Netherlands.**

11–4 551.5:06(73)

Reichelderfer, F. W. [Prepared by Paul W. Whipple], **The United States Weather ureau. Pt. I.** *Weather*, 5(8):273–277, Aug. **1950.** 2 photos. **DWB. Pt. II.** *Ibid.*, (9):319–323, Sept. 1950. 4 photos. **DWB**—Pt. I describes establishment of national eather service (1870), organization, central and regional offices and public weather service. t. II deals with specialized functions—aviation weather service, hurricane and forest fire arnings, horticultural protection, marine and hydrological services, climatology, research, etc. *ubject Headings:* **Meteorological services, United States Weather Bureau.**

11–5 551.5:59:616

Eichler, Wolfdietrich, **Meteorologische Probleme der Flugzeugstäubung in der Mariabekämpfung.** [Meteorological problems of dusting by aircraft in the fight against alaria.] *Meteorologische Rundschau*, 3(7–8):156–157, July–Aug. **1950.** 5 refs. **DWB**—usting of swampy breeding places of Anopheles mosquito with poison (arsenic) has been eveloped especially in Russia. To avoid wide spreading by wind, best done just before sunse on fine days with wind under 3 m./sec. (except during rice flowering), but complicated by orning mist. *Subject Headings:* **Airplane crop dusting, Medical meteorology.**—*C.E.P.B.*

11–6 551.5:355(09)

Kirk, T. H., **Meteorology in the first world war.** *Weather*, 5(9):301–304, Sept. **1950.** Prepared from notes by E. Gold.) **DWB**—Account of formation of Meteor G.H.Q. (General

Headquarters) in France in 1915, meteorology in gas warfare, winds for artillery, fog forecasti
special methods of upper air investigation. *Subject Headings:* **Military meteorology, Histo**

11–7 551.5:629.

Shtal', V., **Meteorologiia na sluzhbe aviatsii.** [Meteorology in the service of aviatio
Kiev, Gosudarstvennoe Voennoe Izdatel'stvo "Na Varti," **1937.** 134 p. 29 figs., numer
tables, fold. charts, 26 refs., 4 append. **DLC**—A popular treatment of general meteorology
pilots, aviation technicians and military aviation officers. The entire work is confined to t
phases of meteorology which are directly applicable to aviation, with considerable material
the making of aerological observations, their dissemination and use by pilots, long range fo
casts, the use of climatic data, and the organization of the meteorological service for aviati
in the U.S.S.R. (at the time: 1932–1937). *Subject Headings:* **Aviation meteorology, U.S.S.R.**
M.R.

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

OBSERVATIONS

11–8 551.501:551.510.

Effenberger, Ernst, **Grundsätzliche Bemerkungen zu den luftchemischen Untersuc
ungen.** [Basic remarks on investigations of the chemistry of the air.] *Annalen der Mete
ologie, Medizin-meteorologische Hefte,* No. 3:1–6, **1950.** 6 figs., table, 5 refs. **MH-BH**
Describes methods of investigation of gases and solids present only in small quantities b
chemically active. Pt. I describes experiments with six gas washing flasks, Pt. 2 with fil
attachments and Pt. 3 rapid methods invented by the author. *Subject Heading:* **Atmosphe
composition.**—*C.E.P.B.*

11–9 551.501:551.5

Markgraf, H., **Um die Realität der "Singularitäten"; (Kritische Betrachtungen dre
"Singularitäten" Arbeiten).** [On the reality of singularities; (critical consideration of thr
works on singularities).] *Annalen der Meteorologie,* 3(5–6):166–169, **1950.** fig. **MH-BH**
Discusses work of Schmauss, Flohn, Hofmann. Concludes that the possibility that sing
larities are accidental extremes has not been excluded but that there are major sections of t
European weather year with characteristic peculiarities. *Subject Heading:* **Singularities.**
C.E.P.B.

11–10 551.501:551.509.

Müller-Annen, Hans, **Zur Aufbereitung und Bearbeitung meteorologischer Reihe
(Untersuchungen, Gedanken und Methoden zur Langfristvorhersage. 5. Beitrag).** [
the standardization and evaluation of meteorological series; (investigations, ideas and metho
in long range forecasting. 5th contribution).] *Annalen der Meteorologie,* 3(5–6):149–1
1950. 5 tables, 13 refs. Summaries in German and English, p. 149. **MH-BH**—Owing
local irregularities, daily values at single stations are not suitable for statistical investigatio
Author discusses use of "character figures", for precipitation numbers of occurrences at statio
in a given area, for temperature number above or below given limits. Meteorological ser
are not long enough for detailed statistical treatment of monthly and annual values, a
division of monthly values into four classes by quartiles is recommended. The use of frequen
tables, cumulative sums of departures and correlation is discussed. *Subject Heading:* **Statisti
analysis.**—*C.E.P.B.*

11–11 551.50

Amble, Ole, **Evaluation of the gradient wind.** *Meteorologiske Annaler,* 2(7):247–262, 19
5 figs., 41 equations. **DWB**—A gradient wind scale with a number of supplementary sca
was developed and is presented in a form which would permit its being placed on celluloid a
used to give rapid and accurate estimates of the gradient wind direct from an isobaric cha
Supplementary scales give correction for temperature, pressure, latitude, displacement of a sh
in 3 hours (for pressure tendency reports from ships). Theory and application are given

detail. Effect of a rapidly changing pressure distribution and of moving pressure systems also considered. *Subject Headings:* **Gradient wind scales, Nomograms, Synoptic analysis.**—*M.R.*

11–12 551.501.4:551.521.4

Barbier, Daniel, **Comparaison des formules donnant les corrections d'extinction dans les observations du ciel nocturne.** [Comparison of formulas giving the corrections of extinction in observations of the night sky.] *Annales de Géophysique*, 5(1):83–84, Jan. **1949.** table, 3 refs., equations. **MH-BH**—The author compares his own formulas of the first and second approximations for calculating the coefficient of extinction in observations of the night sky with those of Piotrowski and Chandrasekhar. All the methods agree for small coefficients of absorption. In larger coefficients of absorption the author's formula is less exact and overestimates the correction of diffusion. *Subject Headings:* **Meteorological observations, Light of the night sky, Extinction coefficients.**—*I.L.D.*

11–13 551.501.4:551.574.7

Hensley, Reece V., **Mollier diagrams for air saturated with water vapor at low temperatures.** *U. S. N.A.C.A., Technical Note*, No. 1715, Sept. **1948.** 16 p. 2+figs., 3 refs., equations. **DLC**—Mollier diagrams with a temperature range from 400° to 540°R. and pressure from 2 to 28 pounds/sq.m., are described and illustrated. These charts are useful in thermodynamic problems of aircraft icing, when dealing with saturated air. Development of charts at N.A.C.A. laboratory at Cleveland and examples of use of charts discussed. *Subject Headings:* **Nomograms, Mollier diagrams, Icing, Aviation.**—*M.R.*

11–14 551.501.42:551.571

Flohn, Hermann, **Zur Berechnung des Wasserdampfgehaltes der Atmosphäre mittels Taupunkt oder relativer Feuchte.** [On the calculation of the water vapor content of the atmosphere by means of dew point or relative humidity.] *Meteorologische Rundschau*, 3(7–8):149–150, July–Aug. **1950.** 2 tables, 5 refs. Summaries in German and English p. 149. **DWB**—The mean vapor pressures calculated from mean dew points and (to a less degree) mean relative humidities are systematically below the true means calculated from direct means of specific humidity. *Subject Heading:* **Water vapor measurements.**—*C.E.P.B.*

11–15 551.501.42:551.508.23

Wörner, H., **Die Berichtigung fehlerhafter Sonnenscheinregistrierungen.** [Correction of erroneous sunshine records.] *Zeitschrift für Meteorologie*, 4(4–5):103–111, April–May **1950.** 7 figs., 2+tables, 18 equations. **DLC**—Discusses errors of sunshine records due to incorrect orientation and levelling of Campbell-Stokes recorder. They are readily recognized from the burns. They affect hourly values but are unimportant in daily totals. Methods of estimation and formulas for correction are given, with an example. *Subject Headings:* **Sunshine recorders, Instrumental errors, Computation tables.**—*C.E.P.B.*

11–16 551.501.7

Herlofson, N., **The T, log p—Diagram with skew coordinate axes.** *Meteorologiske Annaler*, 2(10):311–342, **1947.** 3 figs., 2 tables, 3 fold. plates, 7 refs., 38 equations, append. **DWB**—An elaborate aerological diagram has been devised, which combines the good features of Shaw's tephigram and the Väisälä diagram, for the purpose of quick evaluation of heights of standard isobaric surfaces and significant points; stability of layers; determination of virtual temperature, wet-bulb depression and other moisture relations, etc. The theoretical derivation, general description, plotting procedures, physical constants and symbols, and tables of numerical values used in constructing the diagram are presented in detail. Auxiliary nomograms and the actual chart are included. The skew-diagram chart is completely self-explanatory, at least for anyone familiar with the Lindenberg chart or tephigram. The constants and specifications were determined in consultation with Dr. Sverre Petterssen, President of the Commission on Aerology (IMO). *Subject Headings:* **Aerological diagrams, Tephigrams, Nomograms.**—*M.R.*

11–17 551.501.9:6

Kreutz, W., **Spezielle agrarmeteorologische Aufgaben des Versuchsfeldes Heidelberg Grenzhof und ihre praktische Zielsetzung.** [Special agrometeorological problems of th experimental station Heidelberg-Grenzhof and its practical purpose.] *Deutscher Wetterdien in der US-Zone, Berichte,* No. 12:202–209, **1950.** 15 figs. **MH-BH**—Photographs an diagrams show layout of station. Investigations briefly mentioned include: soil climate an water balance, climate of clumps, connection between weather and minor damage, climate c pig and cow stalls, greenhouse climate, effect of windbreaks. *Subject Headings:* **Agrometeorc logical stations, Agricultural meteorology, Germany.**—*C.E.P.B.*

11–18 551.506.3(41

Manley, Gordon, **On British climatic fluctuations since Queen Elizabeth's day.** *Weathe* 5(9):312–318, Sept. **1950.** table. **DWB**—The range of fluctuations since about 1550 ha been small and the general character similar throughout. Sources of data and interesting date are set out. A brief summary is given of the climatic variations in southeast England. *Subje Headings:* **Observational data, Climatic variations, Great Britain.**

11–19 551.506.7:551.507.362:551.521.6

Greenstein, Jesse L., **The upper atmosphere studied from rockets. A. Research programs** (In **Atmospheres of the earth and planets,** Gerard P. Kuiper, (ed.) Chicago, University c Chicago Press, [**1949**]. p. 112–125. 4 figs., table, 15 refs., 4 equations) Clearman, H. E., **E The ultraviolet solar spectrum.** *Ibid.*, p. 125–134. fig., table. Durand, E., **C. Rocket sond research at the Naval Research Laboratory.** *Ibid.*, p. 134–148. 9 figs. **DLC**—In Pt. A th author gives a general description of a V-2 rocket, of its trajectory and of its telemeterin apparatus. He then discusses the energy distribution in the ultraviolet solar spectrum and it relation to problems of the earth's atmosphere on the basis of observational data obtained b means of rocket flights. Other types of astrophysical data, that can be secured by means c rocket experiments, are listed. In Pt. B the construction of a rocket spectrograph capable c covering the region of the spectrum down to Lyman α and giving a high resolving power i described. A preliminary analysis of the intensities of the spectra obtained with this spectro graph is presented. Direct proof of the transparency of the earth's atmosphere above th ozone layer to 2200Å is provided. In Pt. C the author discusses the research and developmen work in the fields of atmospheric physics, astrophysics and the ionosphere that are bein conducted at the Naval Research Laboratory. Methods for the study of pressure and tem perature of the upper atmosphere are presented. The design and use of a vacuum gratin spectrograph to photograph the sun's rays are described. And there is presented a method fo determining the index of refraction of the atmosphere as a function of altitude by observin the difference in the velocity of propagation of two signals. *Subject Headings:* **Upper ai observations, Rockets, Ultraviolet light.**—*I.L.D.*

INSTRUMENTS

11–20 551.508.2

Brun, M. E., **Thermomètre de surface.** [Surface thermometer.] *France, Centre Na tional de la Recherche Scientifique, Journal des Recherches,* No. 10:21–22, **1950.** 3 figs. **MH-BH** —The author describes the construction and use of an instrument for measuring accuratel surface temperatures. It consists of a plexiglass stirrup piece which holds the wires of a electrocouple. The instrument is distinguished by a low inertia and by a considerable reductio of errors resulting from poor contact between the soldering and the surface. *Subject Heading* **Thermometers.**—*I.L.D.*

11–21 551.508.7

Brun, M. E., **Hydromètre à point de rosée pour atmosphères très sèches.** [Dew poin hygrometer for very dry air.] *France, Centre National de la Recherche Scientifique, Journal de Recherches,* No. 10:17–20, **1950.** 4 figs. **MH-BH**—The author describes the principl and design of an instrument for measuring accurately and quickly the frost point c the atmosphere. The procedure for carrying out actual measurements is described. Th

instrument consists fundamentally of a metallic mirror rigidly attached to a rod that can be cooled by immersion in a freezing mixture and warmed electrically. Also presented, is a modification by means of which the temperature of the mirror can be made to change more rapidly. *Subject Heading:* **Hygrometers.**—*I.L.D.*

11–22 551.508.82:551.510.53

Sieslack, Günter, **Bemerkungen zur Trägheitskorrektion bei Höhentemperaturmessungen.** [Remarks on the correction for lag in upper air temperature measurements.] *Annalen der Meteorologie*, 3(5–6):160–162, **1950.** 2 figs., 4 refs., 5 equations. Summaries in German and English, p. 160. **MH-BH**—A method is set out for determining the true vertical variation of temperature in the tropopause and lower stratosphere by the use of the lag coefficient of bimetallic thermometers. Applicable to any type of radiosonde for which this is known. The true irregularities are often much sharper than in the observed curves. *Subject Heading:* **Radiosonde errors.**—*C.E.P.B.*

11–23 551.508.822

Fea, G. and Panetta, D., **Dispositivo per l'esatto rilevamento del punto al suolo nei sondaggi.** [Device for the precise determination of the base line for a radiosonde.] *Rivista di Metcorologia Aeronautica*, 9(4):25–28, Oct.–Dec. **1949.** 4 figs. Summaries in Italian, English, French and German p. 25. **MH-BH**—The article describes and presents a photograph and schematic diagrams of a ventilating system for the psychrometer and calibration of the radiosonde temperature and humidity elements while making base lines previous to the launching of the soundings. The equipment consists of a small wind tunnel, with a fan at the big end and the psychrometer (with a wick immersed in a well of water) in the middle and the radiosonde ventillated by a stream of air blowing up through it from the small end. Example of base line record, evidently from a Diamond-Hinman radiosonde, shown. *Subject Heading:* **Radiosonde calibration.**—*M.R.*

11–24 551.508.822

Painter, H. E., **International radiosonde trials.** *Weather*, 5(9):307–310, Sept. **1950.** fig., table, 3 photos. **DWB**—Brief descriptions of seven types of radiosondes in use and account of comparative ascents at Payerne (Switzerland) with curves of differences of pressure, temperature and humidity up to 140 mb. and different calculations of heights of pressure levels. Preliminary report. *Subject Heading:* **Radiosondes.**

11–25 551.508.91

Stehberger, K. H., **Eine "elektrische Nase" zur kontinuierlichen Beobachtung des atmosphärischen Aerosols.** [An "electrical nose" for the continuous observation of atmospheric aerosols.] *Deutscher Wetterdienst in der US-Zone, Berichte*, No. 12:171–176, **1950.** 8 figs., 2 refs., equations. **MH-BH**—The presence of floating particles decreases the conductivity of air proportionately to the number of particles per unit volume and their mean surface area. An instrument is described and illustrated, consisting of two large cylindrical condensers in a differential circuit, to measure the difference of conductivity of unfiltered and water filtered air. Curves of diurnal variation are reproduced. *Subject Headings:* **Nuclei counters, Aerosols.**—*C.E.P.B.*

11–26 551.508.93:551.521.6

Lossnitzer, H. and Person, H., **Über Himmelslichtphotometrie.** [On the photometry of sky light.] *Deutscher Wetterdienst in der US-Zone, Berichte*, No. 12:112–116, **1950.** 10 figs., 3 tables, 4 refs. **MH-BH**—Relative measurements of zenith light were made with photoelements combined with color and polaroid filters, giving spectral distribution and polarization. Very small spectral regions were examined with interference filters and electronic amplification. Observations extended into twilight. Results shown in a number of graphs. *Subject Headings:* **Scattering, Polarization, Photometry.**—*C.E.P.B.*

11–27 551.508.94

von Kilinski, Erich, **Die Registrierung der luftelektrischen Feldstärke.** [The recording of field strengths of atmospheric electricity.] *Zeitschrift für Meteorologie*, 4(3):77–81, March **1950.** 6 figs., 10 refs. **MH-BH**—Recording of field strength with thorium collector and electrometer tube and with a new field recorder is summarized; the construction of the latter is described. The V-shaped standard curves which it gives are somewhat ambiguous; possible improvements are discussed and illustrated, including a commutator and auxiliary generator. *Subject Headings:* **Electrometers, Atmospheric electricity instruments.**—*C.E.P.B.*

SYNOPTIC ANALYSIS AND FORECASTING

11–28 551.509:67(04)

Hartnett, William J., **Industrial forecasting.** *Weatherwise*, 3(3):60–61, 68, June **1950.** 2 photos. **MH-BH**—Opportunities for the industrial meteorologist to justify his job, are discussed briefly. *Subject Headings:* **Weather forecasting, Industrial meteorology.**

11–29 551.509:551.515.2

Riehl, Herbert, **Forecasting tropical cyclones.** *Weather*, 5(9):328–329, Sept. **1950. DWB**—Account of conference at Chicago. *Subject Heading:* **Hurricane forecasting.**

11–30 551.509:519.2

van der Byl, W., **Bemerkungen zu meteorologisch-statistischen Problemen.** [Remarks on meteorological-statistical problems.] *Annalen der Meteorologie*, 3(5–6):163–166, **1950. MH-BH**—Criticism of Bartels (*see item* 2–20, *Meteorological Abstracts and Bibliography*, 1(2) Feb. 1950). Statistical tests are applied to "physical" inferences by various authors from frequency data, to show that they may be merely chance distributions. *Subject Headings:* **Statistical analysis.**—*C.E.P.B.*

11–31 551.509.1:621.397

Frank, Marco, **Sistema di sincronismo per facsimile.** [A system of synchronization by facsimile.] *Rivista di Meteorologia Aeronautica*, 9(4):19–24, Oct.–Dec. **1949.** 3 figs. Summaries in Italian, French, English and German p. 19. **MH-BH**—Two different methods of synchronizing facsimile map transmissions are discussed. The system in use in America is not satisfactory for Italy, so the author proposes a third system and elaborates on the theoretical and practical advantages. *Subject Headings:* **Facsimile map transmission, Communication networks.**—*M.R.*

11–32 551.509.22:52

Schindler, Gerhard, **Wie wird unser Beobachtungswetter?** [How will our weather be for observation?] *Sterne. Astronomisches Volksjahrbuch*, p. 46–50, **1950.** fig., table. **DLC**—A calendar of "probable" weather for Central Europe for the year, based on singularities in long-term weather records, to be used by astronomers. General discussion of seasonal peculiarities or singularities in the regular annual course of elements. *Subject Headings:* **Singularities, Central Europe.**—*M.R.*

11–33 551.509.25

Wagemann, Hellmut, **Methodische Bemerkungen zur Konstruktion von Vorhersagekarten.** [Methodological remarks on the construction of forecast charts.] *Annalen der Meteorologie*, 3(5–6):171–172, **1950. MH-BH**—Discusses various ways of calculating isobar charts 24 hours ahead and describes satisfactory results in Hannover of using Scherhag's method. *Subject Heading:* **Prognostic charts.**—*C.E.P.B.*

11–34 551.509.3:551.575

Hoover, Robert A., **Forecasting radiation fog at Elkins, W. Va.** *Monthly Weather Review*, 78(5):75–80, May **1950.** 9 figs., 2 tables, 5 refs. **DWB**—Gradient wind speed, sunset dry-bulb and dew point depression were used as the most indicative parameters in setting up an objective system of forecasting fog at Elkins, W. Va. Nomograms prepared for evaluating

conditions and results of tests for verification are presented and discussed. Nine conclusions which might be used as "rules of thumb" are also presented. Effect of topography indicated by charts and diagrams. Fog forms most frequently on clear nights during prevalence of Atlantic air (easterly gradient) in July, August and September, and rarely when the gradient is from north through west to south in winter (continental air). *Subject Headings:* **Fog forecasting, Objective forecasting, Nomograms, Elkins, West Virginia.**—*M.R.*

11–35 551.509.33

*U. S. Air Weather Service, **Short range and extended forecasting by statistical methods.** *Technical Report*, No. 105-38, Feb. 1948. 202 p. 3 figs., 21 graphs, 2 maps, 37 tables, numerous equations. **DWB**—Final report on research performed over a period of four years, based on statistical analyses of meteorological and climatological data with a view to developing methods of long range forecasting. Statistical methods and verification procedures are considered first. Then elaborate statistical studies are made of movements of high and low pressure areas, correlation of daily temperatures, pressures, humidity, combination of elements and upper air data. Finally, analogue forecasts are tested in great detail. *Subject Headings:* **Statistical forecasting, Extended forecasting.**—*M.R.*

11–36 551.509.31:551.575.1:551.515.8

§Carson, Robe B., **The Gulf Stream front: a cause of stratus on the lower Atlantic Coast.** *Monthly Weather Review*, 78(6):91–101, June 1950. 21 figs., 4 refs. **MH-BH**—Several typical wintertime stratus situations along the Atlantic Coast from Hatteras to Miami are analyzed in detail and illustrated synoptically (Nov. 19–22, Dec. 12–14 and Dec. 22–23, 1947) by means of soundings. Evidence supports theory that this fog is of frontal origin, emanating from the Gulf Stream. *Subject Headings:* **Fog forecasting, Gulf Stream, South Atlantic States.**—*M.R.*

11–37 551.509.31

Tyler, A. G. and Kell, E. B., **Upper air analysis and prognosis at 20Z.** *Weather Development and Research Bulletin*, No. 15:5–11, June 1950. **MH-BH**—The authors describe the methods used to prepare daily upper air analyses at 700 mb. and 500 mb. for 2000Z and to prepare prognostic 700 mb. and 500 mb. charts for 24 hours from 2000Z. The analysis is made by the differential method, which consists of the construction of a contour chart for a base isobaric surface from which the topographies of higher surfaces are obtained by the addition of the relative topographies of intervening isobaric layers. The construction of the 700 mb. surface is presented in detail. The methods considered in the preparation of upper air prognostic charts are as follows: isallohypses, historical or path method and prognostic differential method. *Subject Headings:* **Synoptic analysis, Prognostic charts.**—*I.L.D.*

11–38 551.509.312

Ylinen, J., **On the practicability of extrapolation formulas based on pressure observations in the computation of the movements of pressure centers and fronts.** *Geophysica, Helsinki*, 3:198–206, 1948. 3 figs., tables, 8 refs., 6 equations. **MH-BH**—The author discusses the formulas of Angervo, Petterssen and Byers for computing the movement of high and low pressure centers from the distribution of pressure and variation around the center. The accuracy of the formulas was tested by applying them to 52 cases. The divergences between values calculated by the formulas of Angervo and Petterssen and observed values are analyzed. Divergences are due to changes of velocity during the forecasting period. Formulas in which changes of velocity are considered give poorer results than simple formulas. A comparison between the results obtained with Byers' formula and those obtained with the formulas of Angervo and Petterssen indicate that the former is slightly better for forecasting pressure centers but is inferior for forecasting fronts. *Subject Headings:* **Synoptic analysis, Mathematical forecasting.**—*I.L.D.*

11–39 551.509.67

Rainmaking—past and present. *Weatherwise*, 3(2):26, 46, April 1950. **MH-BH**—Note on history, present status and future of this controversial field of applied meteorology. *Subject Headings:* **Artificial precipitation, Progress in meteorology.**

11–40 551.506.8-551.509.8

Visser, S. W., **De winter en de wijngaardslak.** [Winter and the Roman snail.] *Hemel en Dampkring*, 48(3):51–52, March **1950.** ref. **DLC**—A high correlation was found between the temperature (at Utrecht) during the first ten days of October, and the temperature of the following winter, giving some possible basis of truth to the old proverb about the depth of the snail on the first of October giving an indication of the severity of the coming winter. *Subject Headings:* **Weather lore, Long range forecasting.**—*M.R.*

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

UPPER ATMOSPHERE—IONOSPHERE

11–41 551.510.3

Whipple, Fred L., Jacchia, Luigi, and Kopal, Zdeněk, **Seasonal variations in the density of the upper atmosphere.** (In **Atmospheres of the earth and planets,** Gerard P. Kuiper, (ed.) Chicago, University of Chicago Press, [1949]. p. 149–158. 5 figs., 2 tables.) **DLC**—The authors summarize data on densities of the upper atmospheres as obtained from the Harvard meteor patrol plates. Atmospheric densities have been derived from measurements of velocities and decelerations of meteors and from their masses by integration of their light intensity curves. The direct meteor observations of atmospheric density are in close agreement with the tentative standard atmosphere of the NACA. Significant individual deviations from the mean velocity curve show a marked seasonal character. A strong correlation ($\mu=0.91$) exists between the observed density derivations and the normal ground temperature for the day of observation. Correlations with actual ground temperature and with insolation are progressively less marked. *Subject Heading:* **Atmospheric density.**—*I.L.D.*

11–42 551.510.4:55

Chamberlin, Rollin T., **Geological evidence on the evolution of the earth's atmosphere.** (In **Atmospheres of the earth and planets,** Gerard P. Kuiper, (ed.) Chicago, University of Chicago Press, [1949]. p. 250–259. table, 7 refs.) **DLC**—The implications of the molten globe and accretion hypotheses of the origin of the earth to the genesis and early history of the atmosphere are examined. The geologic record indicates that climatic and atmospheric conditions of early geologic times have not been different from those of later geologic history. Water vapor is the most abundant volcanic gas, with CO_2 next. The uncombined oxygen of the air comes from outside the lithosphere. Photosynthesis by plants is quantitatively adequate to liberate from CO_2 all the oxygen needed. It is generally assumed that much of the nitrogen in volcanic gases is primary and hence is a new contribution to the atmosphere. *Subject Headings:* **Atmospheric composition, Geology, Carbon dioxide.**—*I.L.D.*

11–43 551.510.4

Brown, Harrison, **Rare gases and the formation of the earth's atmosphere.** (In **Atmospheres of the earth and planets,** Gerard P. Kuiper, (ed.) Chicago, University of Chicago Press, [1949]. p. 260–268. fig., 8 tables, 7 refs., equations.) **DLC**—The evidence concerning the terrestrial and cosmic abundance of the rare gases is reviewed. The extent to which rare gases were fractionated from silicon is calculated for each rare gas and also for the other major constituents of the atmosphere. From a consideration of the magnitude of the fractionation factors it is concluded that the earth's atmosphere, including the rare gases, is almost entirely of secondary origin, and it was formed as the result of chemical processes that took place after the formation of the planet. Similar consideration applies to the atmospheres of Venus and Mars. *Subject Headings:* **Atmospheric composition, Planetary atmospheres, Gases.**—*I.L.D.*

11–44 551.510.4:551.571.1

Lejay, R. P., **La mesure à Shanghai de la quantité totale de vapeur d'eau contenue dans l'atmosphère.** [Measurements of the total amount of water vapor in the atmosphere at Shanghai.] *La Météorologie*, 4th Ser., No. 17:29–38, Jan.–March **1950.** 11 figs., 3 refs.

Summaries in French, English and Spanish p. 29. **MH-BH**—Diurnal, seasonal and other variations in water vapor content of the atmosphere can be determined from infrared spectrograph records such as were made from 1937 to 1939 by the author and from 1939 to 1947 by Burgaud. Instrument constructed at the Zi Ka Wei Observatory in 1934 is described and illustrated, along with records for various periods. Application to rainfall forecasting not satisfactory but information obtained useful in analysis of weather conditions. *Subject Headings:* **Atmospheric composition, Atmospheric structure, Water vapor, Zi Ka Wei Observatory, China.**—*M.R.*

11–45 551.510.41

Ungeheuer, H., **Erste Ergebnisse der Aranmessungen in Bad Tölz.** [First results of Aran measurements at Bad Tölz.] *Deutscher Wetterdienst in der US-Zone, Berichte*, No. 12:221–224, **1950.** 9 figs., 6 refs. **MH-BH**—Aran (ozone near ground), which is important bioclimatically, was measured April–Aug. 1949. Results are shown in relation to wind speed and direction, monthly and diurnal variation, during cold fronts and thunder and in air off water and land. *Subject Headings:* **Aran, Atmospheric composition, Germany.**—*C.E.P.B.*

11–46 551.510.41

Migeotte, M. V., **On the presence of CH_4, N_2O and NH_3 in the earth's atmosphere.** (In **Atmospheres of the earth and planets,** Gerard P. Kuiper, (ed.) Chicago, University of Chicago Press, [1949]. p. 284–285. 5 refs.) **DLC**—Lines of the fundamental ν_2 band of CH_4 have been identified at Columbus, Ohio and of the fundamental ν_4 band at Flagstaff, Arizona. The presence of atmospheric N_2O has been confirmed by observations of N_2O bands at 3.9μ, 4.5μ and 8.6μ. The presence of NH_3 in the earth's atmosphere has been reported. *Subject Heading:* **Atmospheric composition.**—*I.L.D.*

11–47 551.510.42

Beers, Norman R., **Stack meteorology and atmospheric disposal of radioactive waste.** *Nucleonics, New York*, 4(4):28–38, April **1949.** fig., 7 photos, 7 refs., equation. **DLC**—Survey of problem of atomic pollution disposal and investigations carried out at Brookhaven, N. Y. with 420 foot tower, micrometeorological installations and artificial smoke ejector. Many photographs show equipment in operation under varying diurnal turbulence conditions. *Subject Headings:* **Atmospheric pollution, Radioactive gases, Brookhaven, New York.**—*M.R.*

11–48 551.510.42

Reeger, E. and Siedentopf, H., **Staubmessungen in der freien Atmosphäre.** [Dust measurements in the free atmosphere.] *Zeitschrift für Meteorologie*, 4(4–5):136–140, April–May **1950.** 3 figs., table, 5 refs. **DLC**—The larger solid particles were counted in various ways up to 2200 m. above ground with a Zeiss konimeter (apparatus described) in airplane ascents. The mean vertical distribution decreased exponentially, falling to 1/*e* of ground value at 300 m. in winter and 1300 m. in summer. The distribution is the same as for condensation nuclei and haze particles, showing that in lowest 2–3 km. there is little sedimentation. In individual flights marked discontinuities occurred at haze limits and inversions. Particles could be counted down to 0.15–0.2μ but as number increased very rapidly with decreasing size, totals have little absolute meaning. Results agree with earlier determinations but a possible source of error is discussed. *Subject Headings:* **Atmospheric pollution, Nuclei count.**—*C.E.P.B.*

11–49 551.510.42

Siksna, Reinhards, **Photographic emulsion method applied to the investigation of radioactive deposits from atmospheric air.** *Tellus*, 2(2):89–92, May **1950.** 5 figs., 7 refs. **MH-BH**—A study made under the direction of Prof. Norinder at the University of Uppsala High Tension Research Institute. The method which is described in detail proves very sensitive to weak radioactive deposits on objects suspended in air which is contaminated. Histograms show the range spectra of α-particles obtained from a high tension transformer room, from the open air, etc. Area density curves of different kinds of active particles photographed, are shown. *Subject Headings:* **Photographic measurements, Atmospheric pollution, Radioactive gases.**—*M.R.*

11–50 551.510.53

Sauberer, Franz, **Unsere Kenntnisse über die hohe Atmosphäre.** [Our knowledge of the upper atmosphere.] *Geographische Gesellschaft, Wien, Mitteilungen*, 91(10–12):225–227, **1949**. ref. **DLC**—Brief note summarizing recent discoveries regarding the structure and composition of the stratosphere, the ionization of the ozonosphere, and the knowledge gained from V-2 ascents or study of the aurora. *Subject Headings:* **Upper atmosphere research, Ozone layer.**—*M.R.*

11–51 551.510.534:551.524.7

†Vassy, A. and Vassy, Mme Étienne, **Recherches sur l'ozone atmosphérique et la température de la stratosphère en Laponie Suédoise.** [Investigations of atmospheric ozone and the temperature of the stratosphere in Swedish Lapland.] *Tellus*, 2(2):69–73, May **1950**. 3 figs., 17 refs. Summary in English p. 69. **MH-BH**—Measurements of ozone in the stratosphere were made by Barbier, Vassy and others at Abisko in Swedish Lapland from Dec. 1934 to March 1935 and during the summer of 1949 by the authors. Other studies made in the Northern Hemisphere are compared with those made in Lapland. An annual mean temperature variation of >100°C. is shown for the ozone layer at Abisko, due to the extreme annual variation in duration of insolation. The amount of ozone at various levels and seasons is discussed. Further studies and measurements necessary to answer questions as to origin of ozone. *Subject Headings:* **Ozone layer, Upper air temperatures, Sweden, Arctic.**—*M.R.*

11–52 551.510.535

Menzel, W., **Das "Wetter" in der Ionosphäre.** [The "weather" in the ionosphere.] *Meteorologische Rundschau*, 3(7–8):176–177, July–Aug. **1950. DWB**—Briefly discusses ionization at different levels, daily and seasonal changes, measurement by wireless waves, effect of sunspots. *Subject Headings:* **Ionization, Ionosphere.**—*C.E.P.B.*

11–53 551.510.535 551.54

Spitzer, Lyman, Jr., **The terrestrial atmosphere above 300 km.** (In **Atmospheres of the earth and planets,** Gerhard P. Kuiper, (ed.) Chicago, University of Chicago Press, [1949] p. 213–249. 5 tables, refs., 24 equations.) **DLC**—This paper is a review of the available theoretical and observational evidence on the nature of the atmosphere above 300 km. It begins with a summary of the data on the temperature, composition and density of the atmosphere from 20 to 300 km. This is followed by a discussion of the theoretical expectations and practical observations on the composition, density and temperature of the atmosphere above 300 km. The physical factors determining its kinetic temperature are evaluated quantitatively. The subject of the rate of excape of planetary atmospheres is discussed theoretically and the resulting conclusions are applied to an analysis of the atmosphere of Mars. *Subject Headings:* **Upper atmosphere, Exosphere, Planetary atmospheres.**—*I.L.D.*

MECHANICS AND THERMODYNAMICS OF THE ATMOSPHERE

11–54 551.511:551.571.

Faust, Heinrich, **"Verdunstungslabilität"—ein neues Mass der atmosphärischen Labilität.** [Evaporation instability—a new measure of atmospheric instability.] *Zeitschrift für Meteorologie*, 4(4–5):97–102, April–May **1950.** 5 figs., 8 tables, 8 refs. **DLC**—Present methods of measuring lability are unsatisfactory because cloud formation depends on relative humidity in free air. Cloud particles rising into dry air are evaporated; after reaching saturation level rising air follows a curve between dry and wet adiabatics. Author plotted occurrence or non-occurrence of thunder on 300 days against thermal lability and upper air humidity and found that sloping boundary lines could be drawn. He defines evaporation lability Λ = thermal lability—(a quadratic function of saturation deficit) × (area between dry and wet adiabatic and 600 mb. line). Positive Λ is associated with severe thunder, negative with stratiform cloud. *Subject Heading:* **Dynamics of the atmosphere, Thunderstorms, Instability.**—*C.E.P.B.*

11–55 551.511:52

Goldie, A. H. R., **The Martian atmosphere.** *Weather*, 5(9):329, Sept. **1950.** ref. **DWB**—Calculates height of tropopause in Mars as 50 km. in middle latitudes and 67 km. at equator. *Subject Headings:* **Tropopause, Planetary atmospheres, Mars.**

11–56 551.511

Hollmann, Günther, **Theorie isobarer Bewegungen.** [Theory of isobaric motion.] *Zeitschrift für Meteorologie*, 4(4–5):130–136, April–May **1950.** 8 refs., 55 equations. **DLC**—A highly mathematical proof that owing to dependence of the Coriolis parameter on latitude, isobaric motions on a rotating earth have the result that, in a stationary pressure field at ground level, the high level pressure field is always displaced considerably westwards. The observed agreement between the displacement velocity of the upper pressure field and the surface gradient wind velocity is therefore not explicable as a process of isobaric motion. *Subject Headings:* **General circulation, Geostrophic winds.**—*C.E.P.B.*

11–57 551.511:532

Laulaja, V., **Combination of the linear and circular horizontal motion.** *Geophysica*, Helsinki, 3:193–197, **1948.** fig., ref., 11 equations. **MH-BH**—The author investigates mathematically the problem of flow and pressure fields by assuming an ideal case in which the flow field consists of translation and of cyclonic motion around a center. It is assumed that the flow is frictionless and takes place in a horizontal surface, and that the angular momentum as regards the center remains constant in the circular motion. *Subject Headings:* **Atmospheric circulation, Fluid mechanics.**—*I.L.D.*

11–58 551.511:551.552

Lettau, Heinz, **A re-examination of the "Leipzig Wind Profile" considering some relations between wind and turbulence in the frictional layer.** *Tellus*, 2(2):125–129, May **1950.** 3 figs., 3 tables, 5 refs., 20 equations. **MH-BH**—P. Mildner (1932) calculated the vertical wind profile and *austausch* distribution for the frictional layer ($Z = < 1000$ m.) from the average results of 28 balloon runs made near Leipzig between 0915 and 1615h. on Oct. 20, 1931. By obtaining the deviation of the azimuth of the geostrophic wind from the weather map, the calculated *austausch* was too large below 300 m. and too small above 300 m. In the present article Lettau has made a more accurate determination of the deviation of the geostrophic wind from the "Leipzig Profile" and using the average *austausch* distribution obtained by three different formulas, arrived at the conclusion that: "the energy for maintaining turbulence in a steady frictional wind profile is taken from the potential energy of the horizontal pressure field by means of the steady flow of air across the isobars." Computations by the three methods are tabulated, averaged and the standard deviation shown. *Subject Headings:* **Micrometeorology, Leipzig profile, Gradient winds, Frictional effects, Turbulent exchange.**—*M.R.*

11–59 551.511:525

Munk, W. H. and Miller, R. L., **Variation in the earth's angular velocity resulting from fluctuations in atmospheric and oceanic circulation.** *Tellus*, 2(2):93–101, May **1950.** 2 figs., 5 tables, 17 refs., 10 equations. **MH-BH**—An intriguing theoretical discussion of the effect of changes in the velocity of rotation of the earth produced by changes in the atmospheric circulation persisting for periods of the order of two weeks or more. Whereas, observed astronomical changes in angular velocity of the earth are very small, the computed effect of circulation changes is 20% or less of the total effect, partly due to compensatory changes in the circulation of the opposite hemisphere, the oceanic currents, etc. The author has computed the seasonal component of anomalies in atmospheric pressure, water mass, etc. from U. S. Weather Bureau Normal Sea Level Weather Charts and other sources, for 80°N to 80°S, and made his calculations from these data. *Subject Headings:* **Planetary atmospheres, Dynamics of the atmosphere, Ocean currents.**—*M.R.*

11–60 551.511

Raethjen, P., **Über den Dualismus der atmosphärischen Druckfelder.** [On the dualism of the atmospheric pressure field.] *Deutscher Wetterdienst in der US-Zone, Berichte*, No.

12:185–197, 1950. 5 figs., 30 formulas, 20 refs. **MH-BH**—"Dualism" is the combined therma and dynamic origin of the geostrophic pressure and wind field. Author examines sever problems: type dualism of origin of whirls; dynamic and static compensation; maximum diameter of high level cyclones; origin of three planetary wind zones and polar front; monsoona coastal high pressure areas, especially on the coast of Europe; origin of the *jet stream* and othe disturbances at the tropopause; long range forecasts of changes of pressure field. *Subjec Heading:* **Dynamics of the atmosphere.**—*C.E.P.B.*

11–61 551.511:551.515.

Rouaud, A., **Quelques considérations sur les trajectoires et les lignes de courant.** [Som considerations of trajectories and airflow.] *Journal Scientifique de la Météorologie*, 2(6):33–49 April–June 1950. 11 figs., 3 refs., 9 equations. Summaries in French, English and Spanis p. 33. **MH-BH**—The simple case of a circular cyclone moving with uniform velocity i extended (after Berry, Bollay and Beers; Ertel and Petterssen) to take in the case where th wind speed is not uniform but a function of the radius vector. The resulting trajectories an modification of fronts (shown on polar coordinates) show considerable similarity to thos existing in nature, although the theoretical models are necessarily oversimplified. *Subjec Headings:* **Mechanics of the atmosphere, Frontogenesis, Cyclonic trajectories.**—*M.R.*

GENERAL CIRCULATION

11–62 551.51

§Phillips, Norman A., **The behavior of jet streams over eastern North America during January and February 1948.** *Tellus*, 2(2):116–124, May 1950. 11 figs., 6 refs. **MH-BH**— A synoptic aerological study of a 44-day period (Jan. 10 to Feb. 29, 1948) during which severa *jet stream* areas moved southward over North America and finally disappeared, being replaced by newly formed *jet streams* which appeared in northern Canada. Meridional cross sections 300 mb. charts and graphs showing the day-to-day position (latitude) of *jet stream* along the 80° meridian W. The existence of double *jet streams*, their discontinuous nature, the rise in potential temperature and the disappearance of the solenoidal field accompanying the jet as i moves into subtropical latitudes and rises, are emphasized. *Subject Headings:* **Jet stream Synoptic-aerological studies, North America.**—*M.R.*

11–63 551.513:551.52

Portig, W., **Wetterskizze Nr. 6—Grosswetterlage und Temperatur.** [Weather sketch No. 6—General weather situation and temperature.] *Annalen der Meteorologie*, 3(5–6):173 1950. **MH-BH**—In December 1942 daily temperatures in Hamburg closely resembled December 1941, but the pressure distribution was quite different. *Subject Headings:* **Genera circulation, Climatology, Hamburg.**—*C.E.P.B.*

11–64 551.513:550.38

Rudloff, W., **Die atmosphärische Zirkulation über Europa zur Zeit erdmagnetische Stürme in den Jahren 1884–1942; (Vorläufige Mitteilung).** [The atmospheric circulation over Europe at the time of magnetic storms in the years 1884–1942: (Advance communica tion).] *Annalen der Meteorologie*, 3(5–6):178–181, 1950. 2 figs., 4 tables. **DWB**—The drif component of geostrophic wind parallel to earth's axis was examined on 21 days centered on days of magnetic storms in each month. Months a half year apart show great similarity Statistical examination shows the reality of the relation to magnetic storms in March bu September is within accidental limits. Author suggests "electrosphere" (ionosphere) steering *Subject Headings:* **General circulation, Magnetic storms, Europe.**—*C.E.P.B.*

11–65 551.513.1:551.5

Bossolasco, M., **On the role of the tropics in the general circulation of the atmosphere** *Tellus*, 2(2):134–136, May 1950. 2 figs. (Letter to the editor.) **MH-BH**—A short, bu well-illustrated, article based on meteorological and aerological observations made by the author at Mogadiscio in Italian Somaliland during the International Polar Year, 1932–1933 Summaries of anemograph records show two transition periods from the one monsoon to the

other (as inferred from surface turbulence). The upper air wind summaries (1300 pilot balloon observations) show the variability of the lower border of the advection layer from day-to-day. *Subject Headings:* **General circulation, Tropical meteorology, Trade winds, Sudan monsoon, Upper air winds, Somaliland.**—*M.R.*

ATMOSPHERIC DISTURBANCES

11–66 551.515:621.396

Bender, Hertwig K., **Erfahrungen bei neueren Messungen der atmosphärischen Störungen des Funk-Empfangs vorzugsweise auf 9 MHz.** [Results of new measurements of atmospheric disturbances of radio reception, principally on 9 MHz.] *Deutscher Wetterdienst in der US-Zone, Berichte*, No. 12:161–166, **1950.** 6 figs., 2 refs. **MH-BH**—Three methods of recording disturbances in wireless communication are described. Diurnal variation of static and influence of thunderstorms and fronts are discussed and a possible effect of penetrating cosmic rays considered. No connection was found with reflection or damping in the ionosphere. *Subject Headings:* **Atmospheric disturbances, Radio communication.**—*C.E.P.B.*

11–67 551.515(41)

Levick, R. B. M., **Fifty years of British weather.** *Weather*, 5(7):245–247, July **1950.** 2 figs. **DWB**—Refers to article in *Weather*, July 1949. Gives frequencies of various types of weather in Scotland and Ireland 1898–1947. *Subject Headings:* **Synoptic climatology, Scotland, Ireland.**

11–68 551.515.1

§Kruhl, Heinrich, **Induzierte Zyklogenese.** [Induced cyclogenesis.] *Annalen der Meteorologie*, 3(5–6):136–148, **1950.** 12 figs., table, 15 refs. Summaries in German and English p. 136. **MH-BH**—Investigates abnormal depressions in Europe-Atlantic region which suddenly deepen and turn towards a high level anticyclone. Subsequently they fill up suddenly. The depression of November 14–15, 1948 is discussed in detail with surface and upper air charts, and nine cases altogether are tabulated. All show the advent of a primary area of rising pressure, the advance northwards of a broad tongue of warm air to the rear of the depression, and a small cold tongue in the south. The development is not explicable by lability in the local pressure and temperature field; it is due to more general processes. The groups of weather types related to induced cyclogenesis are set out and the theory of the development is discussed. An important contribution to forecasting technique. *Subject Headings:* **Cyclogenesis, Synoptic analysis, Europe, North Atlantic Ocean.**—*C.E.P.B.*

11–69 551.515.1:551.543.6

§O'Connor, James F. and Norton, Lewis C., **A late-season storm over the plateau area.** *Monthly Weather Review*, 78(6):105–111, June **1950.** 15 figs., 4 refs. **MH-BH**—A careful synoptic analysis of the cyclonic storm (June 6–10, 1950) which produced lowest pressure on record for June in Nevada and Utah (minimum sea level pressure 984 mb. at Wendover, Utah 0030 June 7). Frost did much damage in Rocky Mountain States; and Great Falls, Montana had 11.1 in. of snow on June 7 and 8. Dust storms and strong winds did further damage. *Subject Headings:* **Cold waves, Snowstorms, Cyclonic storms, Rocky Mountains.**—*M.R.*

11–70 551.515.11

§Kleinschmidt, Ernst, jun., **Über Aufbau und Entstehung von Zyklonen. I Teil.** [On the origin and development of cyclones. Part I.] *Meteorologische Rundschau*, 3(1–2):1–6, Jan.–Feb. **1950.** 11 figs., 2 refs., 16 equations. **DWB. II Teil,** *ibid.*, 3(3–4):54–61, March–April **1950.** 10 figs. **DWB**—In Pt. I, the rapidly developing depression of March 5–7, 1943, Europe is analyzed. Over and to west of center was a lens-shaped mass of air at 5–10 km., which gradient of potential temperature was large; the overlying stratosphere was raised. The boundary of this air mass was mapped at 12-hourly intervals and is shown stereoscopically. It is assumed that part of the atmosphere was replaced by a lens of different structure and the dynamics are discussed by means of a simplified model, in which a quantity Z is introduced depending on gradient of potential temperature; this determines the development. In Pt. II,

charts 15–17 November 1943 show development of a frontal wave, analyzed in vertical section of potential and wet-bulb potential temperatures, temperature gradient and geostrophic wind. Stream lines are indicated in a 3-dimensional sketch, showing a lower northerly stream to west of surface front and an upper easterly stream to east. Author then discusses origin of cyclon quantitatively, showing how value of Ertel's Z is increased in lower and decreased in upper current. This represents a new condition of equilibrium, cyclonic below, anticyclonic above. Thus a young frontal cyclone exists only in lower half of troposphere. *Subject Heading* **Cyclogenesis, Air masses, Fronts.**—*C.E.P.B.*

11–71 551.515.1

Hsieh, Yi-ping, **The mean wind and temperature distribution through a flat upper ridge in winter.** *Tellus*, 2(2):130–133, May **1950.** 7 figs., 4 refs. **MH-BH**—A brief study of the average conditions over North America at times when a flat upper ridge prevails. The structure (temperature and wind field) and dynamics (wind shear and vorticity) of this formation are discussed and illustrated by mean cross sections. These characteristics agree with those associated with troughs (Palmén and Newton, 1948) but the contrasts and intensities are not so marked in the case of the flat ridges. *Subject Headings:* **Air masses, General circulation, Cross sections, North America.**—*M.R.*

11–72 551.515.1

§Meyer, Hans Klaus, **Flug durch ein kaltes Tief über See.** [Flight through a cold low over the sea.] *Meteorologische Rundschau*, 3(7–8):173–174, July–Aug. **1950.** 3 figs., ref. **DWB**—Summarizes results of British met flight on August 28, 1946 through a frontless cold low south of Iceland. Charts show surface weather, relative topography 1000–500 mb. and isotherms at 500 mb., the latter showing an island of cold air coincident with surface low. A cloud section indicates regions of convergence and divergence. *Subject Headings:* **Cyclones, Seclusions.**—*C.E.P.B.*

11–73 551.515.

Nishimura, D., **On the structure of typhoon (Part I).** *Geophysical Magazine, Tokyo*, 21(2):107–122, March **1950.** 5 figs., 2 tables, 11 refs., 25 equations. **MH-BH**—The author cites data on the temperature, relative humidity and pressure relationships prevailing within the eye of a typhoon and on the existence of a thermal discontinuity on the boundary of the eye. An approximate solution of the equations of motions is presented in terms of vertical motion and eddy viscosity when the isobars are circular, and a dynamical equation for the formation of the eye of typhoons is formulated under the condition that the direction of the wind becomes tangential to the circular isobar of the boundary. *Subject Headings:* **Typhoons, Hurricane structure.**—*I.L.D.*

11–74 551.515.

Uwai, K., **Analysis of the typhoon "Kathleen." (1) Mechanism of heavy rainfall and front in Kwanto, Chubu and Tôhoku districts.** *Geophysical Magazine, Tokyo*, 21(2):147–1 March **1950.** 14 figs., tables, 7 refs., 19 equations. **MH-BH**—The author describes the course and character of the typhoon, including the generation of secondary typhoons and depressions. The various fronts are analyzed and the observational data are compared with theoretical presuppositions involving the theory of stationary and nonstationary states. The characteristics of the frontal rainfall group are discussed. A possible explanation for the propagation of progressive rainfall groups in front of the warm front is proposed. *Subject Headings:* **Typhoons, Hurricane structure, South Pacific, Japan.**—*I.L.D.*

11–75 551.51

Feteris, P. J., **The Dutch tornado of 21 June, 1950.** *Weather*, 5(8):287–289, Aug. 19 fig., photo. **MH-BH**—A destructive tornado, diameter 60 yards, travelled NE in southw Holland, a second tornado occurred further northeast and a group of thunderstorms a occurred. Chart shows tracks and locations of large hail and severe damage. *Subject He ings:* **Tornadoes, Hail, Netherlands.**

11–76 551.515.3:551.577.2

Flohn, Hermann and Huttary, Josef, **Über die Bedeutung der V^b-Lagen für das Niederschlagsregime Mitteleuropas.** [On the importance of the V^b-track for the precipitation regime of central Europe.] *Meteorologische Rundschau*, 3(7–8):167–170, July–Aug. **1950.** 4 figs., table, 16 refs. **DWB**—The amounts of rainfall at 38 stations were computed on 96 typical V^b days (1930–1943, mean 6.8 days a year mostly in spring and autumn) and expressed as percentages of annual means. The maximum extends from eastern margin of Alps (12%) to Vistula mouth with a rapid decrease to northwest. Also gives chart of "specific precipitation density" (amount per V^b precipitation day as percent of average of all precipitation days) showing values up to 300%. *Subject Headings:* **Cyclone tracks, Precipitation distribution, Central Europe.**—*C.E.P.B.*

11–77 551.515.3

Henderson, J. P., **Waterspouts on Lake Victoria, East Africa.** *Weather*, 5(9):326–328, Sept. **1950.** fig. **DWB**—Describes and illustrates development of an unusual waterspout on January 4, 1950. Also gives account of flying through a waterspout. *Subject Headings:* **Waterspouts, Lake Victoria, East Africa.**

11–78 551.515.4

Mull, S. and Rao, Y. P., **Dynamics of thunderstorms. Part I. Review of the present explanations for pressure changes in thunderstorms.** *Indian Journal of Meteorology and Geophysics*, 1(2):116–136, April **1950.** 10 figs., table, 10 refs., 13 equations. **DWB, MH-BH**—A number of classical hypotheses as to the cause of pressure changes accompanying various types of thunderstorms, are discussed theoretically and in the light of actual records. Many of these automatic records of surface pressure, temperature (dry- and wet-bulb) and wind velocity are reproduced to illustrate the wide variety of types of both pressure and temperature change which may occur. For instance pressure may fall or remain steady, or the temperature may rise or remain steady even when severe wind squalls are passing the station. The explanations that changes are due to (a) temperature changes, (b) downrush of air, (c) drag in circulation due to vertical motion, or (d) friction, (e) double ring vortices, or (f) vertical acceleration, are all critically examined and rejected. *Subject Heading:* **Thunderstorm dynamics.**—*M.R.*

11–79 551.515.8

§Gould, Donnel H. and Norton, Lewis C., **Some synoptic aspects of the hot weather in California, May 29–31, 1950.** *Monthly Weather Review*, 78(5):84–89, May **1950.** 12 figs., 2 refs. **DWB**—Detailed 700 mb., 500 mb. and adiabatic charts for North America and surface synoptic and maximum potential temperature charts for California and Nevada present a clear picture of conditions before and during the prevalence of temperature of 100° to 108°F. in the Sacramento and San Joaquin Valleys of California. *Subject Headings:* **Heat waves, Synoptic studies, California.**—*M.R.*

11–80 551.515.8:551.515.7

Faust, Heinrich, **Über die Wetterwirksamkeit von Fronten im Hochdruckgebiet.** [On the weather effectiveness of fronts in the high pressure region.] *Meteorologische Rundschau*, 3(7–8):170–173, July–Aug. **1950.** fig., 2 tables. **DWB**—The frequency of precipitation and overcast at fronts in deep anticyclones is investigated under headings: central pressure, sector, time of day, and season. The weakening effect of anticyclones on fronts is found to be considerably less than hitherto supposed. The absolute pressure in center is unimportant; the main factor is the pressure difference between center of high and front. The sector is also important. *Subject Headings:* **Fronts, Anticyclones.**—*C.E.P.B.*

11–81 551.515.8

Mitchell, L. R., **Arctic or Antarctic and Polar fronts.** *Weather Development and Research Bulletin*, No. 15:40–50, June **1950.** 5 figs. **MH-BH**—The author summarizes existing knowledge on the formation and character of the Antarctic front. The historical development of investigations of the Antarctic front and the conclusions of Kidson and Palmer are presented.

Results of present day Australian meteorological research in the Southern Ocean and the Antarctic regions and their bearing on the Antarctic front and frontogenesis are summarized. *Subject Headings:* **Frontal zones, Frontogenesis, Antarctic, Australia.**—*I.L.D.*

11–82 551.515.8

Schulz, G., **Wetterskizze Nr. 7—Der Warmluftvorstoss in der mittleren Troposphäre am 9.11.1949.** [Weather sketch No. 7—The warm air advance in the middle troposphere on Nov. 9, 1949.] *Annalen der Meteorologie*, 3(5–6):173–174, **1950.** 3 figs. **MH-BH**—Curves show the temperature at various stations and wind speed at Iserlohn up to 200 mb. Between 400 and 450 mb. warm air penetrated nearly calm air 8–11°C. colder, with a speed of 260 km./hr. *Subject Headings:* **Warm fronts, Germany.**—*C.E.P.B.*

11–83 551.515.8:551.555.3

Stranz, D., **Ein Beispiel "freien Föhns" im Flachland.** [A sample of "free föhn" on level ground.] *Zeitschrift für Meteorologie*, 4(4–5):149–151, April–May **1950.** fig. **DLC**—About 2 A.M. on August 7, 1944, during an anticyclone, the subsidence inversion passed the station 100 m. above valley floor at Leipzig, giving a sharp rise of temperature and fall of humidity but did not reach valley station 60 m. lower until sunrise. There was a short advective fall of humidity at low station between 4 and 6 A.M. Hourly curves are given with a discussion of winds and haze. *Subject Headings:* **Föhn winds, Leipzig, Germany.**—*C.E.P.B.*

RADIATION AND TEMPERATURE

RADIATION

11–84 550.38:551.521.1

Alfvén, H., **Discussion of the origin of the terrestrial and solar magnetic fields.** *Tellus*, 2(2):74–82, May **1950.** 5 figs., 15 refs., equations. **MH-BH**—This article discusses and illustrates the kinematics and dynamics of magnetic field amplification, the generation of magnetic fields in celestial bodies, the earth's magnetic field and the difference between slow and rapid motion. It is stated that an original meridional field can, by hydrodynamic motion get an east-west component, and that this component cannot exceed the order of magnitude of the original field. If it does, the field becomes unstable and an increase of the meridional component is caused. *Subject Headings:* **Terrestrial magnetism, Solar influences.**—*M.R.*

11–85 551.521.1

Stagg, J. M., **Solar radiation at Kew Observatory.** London, H. M. Stationery Office, **1950.** 37 p. 14 figs., 24 tables, 15 refs. (Great Britain Meteorological Office, *Geophysical Memoirs*, No. 86.) At head of title: M.O.530a. **MH-BH**—Pt. I, deals with direct solar radiation at normal incidence, measured by a Gorczynski pyrheliograph. Monthly totals are given for 1933–1946, totals for various categories of days, frequency distributions and tables of hourly values; the latter are related to sun's altitude and air mass. They are analyzed into south, west and vertical components for information of architects. Reduction of direct radiation by scattering, absorption and reflection is analyzed and various measures of atmospheric transmission discussed. Pt. II, deals with direct and diffuse short wave radiation from sun and sky on a horizontal surface; monthly, hourly and extreme values are given and related to sun's elevation and cloud type. *Subject Headings:* **Solar radiation, Short wave radiation, Kew Observatory, England.**

11–86 551.521.1/2:551.584:41:595.7:63

Wellington, W. G., **Effects of radiation on the temperatures of insectan habitats.** *Scientific Agriculture*, 30:209–234, May **1950.** 3 figs., 4 tables, 29 refs. (Reprint available.)—This study deals with the effects of solar and terrestrial radiation upon the microclimates of insectan habitats and upon the internal temperature of the insects themselves. The apparatus and methods utilized in obtaining the microclimatic data are discussed. The importance of tree-borne snow to stages of insects overwintering upon or within the twigs of trees, the surface temperatures of foliage and of the bark of twigs, and the internal temperatures of vegetative buds

of expanding shoots, of staminate flowers, of leaf rolls constructed by a tortricid on aspen and of the webbed tunnels of the spruce budworm were investigated. The body temperatures of larvae of this insect were measured in relation to tunnel and air temperatures. In addition the web temperature of leaf caterpillars of the fall webworm were measured. *Subject Headings:* **Micrometeorology, Radiation effects, Forest entomology.**—*I. L. D.*

11–87 551.521.4:551.510.355

Abadie, P., Vassy, A., and Vassy, Mme Étienne, **Sur la lumière du ciel nocturne; effet de latitude.** [Light of the night sky; effect of latitude.] *Annales de Géophysique*, 5(2):157–163, Feb. 1949. 4 figs., 11 refs. **MH-BH**—This is a study of the probable mechanism of excitation of the light of the night sky and the altitude at which it originates. In order to avoid the disturbing influence of auroral activity the authors have measured, at low latitudes, the distribution of the intensity of the light of the night sky for the bands 5577 and 6300Å. The observations indicate that this phenomenon can be explained by assuming the existence of a single ionospheric layer, whose altitude decreases regularly from 1000 km. at the beginning of the night to 400 km. at three o'clock in the morning. *Subject Headings:* **Light of the night sky, Ionospheric layers.**—*I. L. D.*

11–88 551.521.4

Richter, N., **Bestimmungen des nächtlichen Transmissionskoeffizienten der Atmosphäre in der Libyschen Sahara und an der Küste Tripolitaniens.** [Determinations of the nocturnal transmission coefficients of the atmosphere in the Libyan Sahara and on the coast of Tripolitania.] *Zeitschrift für Meteorologie*, 3(10):309–312, Oct. 1949. 4 tables, 4 refs. **DLC**—Observations of extinction on eight nights, star on horizon against zenith star, by Hoffmeister's mirror method gave transmission coefficients about 0.77 in Tripoli and 0.83 in Sahara, but in a moderate sandstorm only 0.54. Compared with similar observations elsewhere Tripoli is suitable for astronomical observations, taking into account also mean cloudiness and humidity, but not with instruments effected by changes of temperature. *Subject Headings:* **Transmission coefficients, Light of the night sky, Sahara, Libya, Tripolitania.**—*C.E.P.B.*

11–89 551.521.61

McMath, Robert R. and Golberg, Leo. **Recent exploration of the infra-red solar spectrum at the McMath-Hulbert Observatory.** *American Philosophical Society, Proceedings*, 93(5):362–372, Nov. 30, 1949. 5 figs., 18 refs. **DLC**—Program outlined; instrumentation discussed and illustrated; numerous spectra in region 1.5 to 1.78μ reproduced and analyzed; research problems such as wave length measurements, solar limb darkening, interpretation of solar line intensities, sunspot spectra; and finally, problems of the earth's atmosphere which are being solved by this research. *Subject Headings:* **Infrared radiation, Solar spectrum.**—*M.R.*

11–90 551.521.63

Adel, Arthur, **Selected topics in the infrared spectroscopy of the solar system.** (In **Atmospheres of the earth and planets,** Gerard P. Kuiper, (ed.) Chicago, University of Chicago Press, [1949]. p. 269–283. 12 figs., table, 28 refs.) **DLC**—Various problems of astrophysical interest can be solved by means of infrared spectroscopy. These comprise the presence of polyatomic compounds in the atmosphere, computation of the kinetic temperatures of planetary atmospheres and the nature of planetary surfaces. In addition, infrared spectroscopy is useful in studying atmospheric transmissions for determining accurately the heat balance of the earth, the temperature of the sun and that of the ozonosphere. Some results obtained, by the application of this technique to these problems, are summarized. *Subject Headings:* **Solar spectrum, Infrared radiation.**—*I. L. D.*

11–91 551.521.64

Bagge, E. et al., **Kosmische Ultrastrahlung; theoretische Arbeiten über Mesonen, Nukleonen und Kernzertrümmerungen in der kosmischen Strahlung.** [Cosmic ultraradiation; theoretical works on mesons, nucleons and nuclear fission in cosmic radiation.] In **Nuclear physics and cosmic rays, Pt. I,** Walter Bothe and Siegfried Feugge, Sr. authors. Wiesbaden, Office of Military Government for Germany, FIAT, 1948. p. 21–106. figs.,

numerous tables, 154 refs., equations. [*FIAT Review of German Science 1939–1946.*] **DLC**—Several sections deal with research in Germany on distribution and variations of cosmic rays in the atmosphere. *Subject Heading:* **Cosmic radiation.**

11–92 551.521.6

†Jauch, J. M., **Cosmic Rays – I.** *Nucleonics, New York*, 4(4):39–51, April **1949.** 7 figs., 28 refs., 30 equations. **DLC**—A comprehensive review of the entire subject: variations in height intensity; latitude with magnetic variations; soft components; hard, penetrating showers; genesis; etc. *Subject Heading:* **Cosmic radiation.**—*M.R.*

11–93 551.521.6

Simons, Lennart, **Coincidence counting-apparatus for cosmic-ray work.** *Geophysica Helsinki*, 3:89–92, **1948.** 3 figs. **MH-BH**—The purpose of this coincidence counting apparatus is to register simultaneously radiation particles of beta-gamma and of gamma-gamma coincidences. Not just any particle by itself is counted, but a particle is registered as one if it passes along a definite path through two counters or if two particles appear in their respective counters within a given time interval θ, which is the resolving time of the apparatus. A diagram of the apparatus and results obtained with it are presented. *Subject Headings:* **Cosmic ray instruments, Radiation measurements.**—*I.L.D.*

TEMPERATURE

11–94 551.524.32(43

Antonik, Bertold, **Wärmerückfälle Ende November und im Dezember.** [Return of warm weather at the end of November and in December.] *Zeitschrift für Meteorologie* 4(4–5):147–149, April–May **1950.** 3 figs., 5 tables, 2 refs. **DLC**—Daily mean temperatures at Berlin show periods of relatively high temperature about November 30, December 8 and 18. The frequency distribution is studied in relation to Baur's weather types (they occur with oceanic types) and mean daily pressures at Potsdam. *Subject Headings:* **Temperature variations, Berlin, Germany.**—*C.E.P.B.*

11–95 551.524.36:551.524.

Steleanu, Adrian, **Über die Streuung der Monatstemperaturmittel an Berg- und Tal stationen.** [Distribution of the monthly mean temperatures at mountain and valley stations.] *Zeitschrift für Meteorologie*, 4(4–5):141–146, April–May **1950.** 5 tables, 8 refs. **DLC**—Mean and extreme departures of temperature from normal at a number of mountain and adjacent valley stations in each month are tabulated and vertical temperature gradients of extreme months discussed in relation to pressure distribution. Very cold months all show increased lapse. Correlation coefficients between temperatures at mountain and valley stations range from +.56 to +.98, but between temperature lapse and mountain temperature they are mostly negative. Relative intensities of departures in 22 extreme months are characterized by ratio to standard deviation. *Subject Headings:* **Temperature distribution, Temperature extremes.**—*C.E.P.B.*

11–96 551.524.7:551.513.

Loewe, F., **Temperature variations in and above the cold polar surface layer.** *Weather* 5(8):292–293, Aug. **1950. MH-BH**—Discusses article by C. E. P. Brooks on "Climatic fluctuations and the circulation of the atmosphere" (*see item* 5–88, *Meteorological Abstracts and Bibliography*, 1(5), May 1950) but finds that it is not supported by the available observations. *Subject Headings:* **Upper air temperatures, General circulation.**

11–97 551.524.7(41C

Murray, R., **Freezing level over the British Isles.** *Weather*, 5(8):284–287, Aug. **1950.** figs. **MH-BH**—Monthly mean values of freezing level (32°F.) at Larkhill from radiosonde ascents 1942–1947 are shown graphically, and variability from year to year is described. Estimated isopleths of mean height in the extreme months of February (3500–2000 ft.) and August (11,000–8500 ft.) are shown on maps. Monthly means are of little use in forecasting. *Subject Headings:* **Upper air temperatures, Great Britain.**

11–98 551.526.6(26)

Bullig, H.-J., **Über Wassertemperaturanomalien des östlichen Atlantischen Ozeans und ihre meteorologische Bedingtheit.** [On sea temperature anomalies of the eastern Atlantic and their meteorological causation.] *Deutscher Wetterdienst in der US-Zone, Berichte,* No. 12:137–140, **1950.** fig., 5 tables. **MH-BH**—The monthly and annual anomalies at nine stations east of 30°W, between 50°N and 0° are analyzed by numerous correlation coefficients. High correlation with air temperature and with (air-water) temperature of preceding month. The anomalies are related to wind force and number of clear days; little relation to ocean currents. Observations 1886–1937 show no definite secular change. *Subject Headings:* **Sea temperatures, Eastern Atlantic.**—*C.E.P.B.*

11–99 551.526.6

Loewe, F., **Some observations in the surface layers of Antarctic waters.** *Marine Observer,* 20(149):152–153, July **1950.** fig. **MH-BH**—Observations with bathythermograph to 150 meters depth in 57–66°S showed a narrow layer of cold water extending obliquely from 120 m. in 57°S to 60 m. in 64°S. Not found at 66°S. *Subject Headings:* **Sea temperatures, Antarctic.**

11–100 551.526.8:551.311.182

Range, Paul, **Die Dauer der Eisdecke auf den Grunewaldseen bei Berlin 1919–1944.** [Duration of the ice cover on the Grunewald lakes near Berlin 1919–1944.] *Zeitschrift für Meteorologie,* 3(11–12):325–329, Nov.–Dec. **1949.** fig., 2 tables, ref. **DLC**—Gives dates of first and last ice, complete covering (at least 5 cm. thick) and in some years, thickness. Mean duration of complete covering 56 days. Also gives duration of artificial ice rinks. Causes of variations complex; each lake has individual peculiarities. *Subject Headings:* **Ice cover duration, Grunewald lakes, Germany.**—*C.E.P.B.*

TURBULENCE AND WIND

TURBULENCE

11–101 551.551:551.511(02)

†Lettau, Heinz, **Atmosphärische Turbulenz.** [Atmospheric turbulence.] Leipzig, Akademische Verlagsgesellschaft, **1939.** 283 p. 59 figs., 25 tables, 246 refs., numerous equations. (Lithoprinted by Edwards Brothers, Inc., Ann Arbor, Michigan, 1944.) **DLC**—This classic text comprises the most thorough and systematic treatment of turbulence ever attempted. It includes chapters on turbulence in general; the history of research on hydrodynamics and (since 1904) on turbulence; kinetic theory of gas movement; *austausch* and turbulence near the earth's surface; *austausch* and turbulence in atmospheric boundary layers; friction and energy dissipation in atmospheric currents; measurement of parameters connected with turbulence; large scale (planetary) turbulence and finally 11 pages of bibliography. *Subject Headings:* **Turbulence, Energy exchange, Fluid mechanics, Textbooks.**—*M.R.*

11–102 551.551:551.513

Ogawara, M., **On the form of turbulent vortex near the earth's surface.** *Geophysical Magazine, Tokyo,* 21(3):226–244, March **1950.** 10 figs., tables, 3 refs., 40 equations. **MH-BH**—This is a theoretical discussion of turbulence in the free atmosphere. The nature of turbulence can be determined by classifying it into several categories according to the dimensions of velocity fluctuations and by studying the turbulent motion of one scale in relation to that of the next larger scale. Extremely small scale turbulence and large scale turbulence were analyzed by means of the theory of stochastic process for vortex systems and by means of the theory of time series. *Subject Headings:* **Turbulence, General circulation.**—*I.L.D.*

WIND

11–103 551.553.21

Flohn, H., **Neue Erkenntnisse über die Monsunzirkulation.** [New knowledge of the monsoon circulation.] *Meteorologische Rundschau,* 3(7–8):176, July–Aug. **1950. DWB**—Briefly describes (1) tropical monsoon with westerly, (2) with easterly component, (3) southeast

monsoon of East Asia, (4) extratropical seasonal winds. Discusses permanence of high leve troughs on east coasts of North America and Eurasia. *Subject Headings:* **Monsoon circulation East Asia, North America, Eurasia.**—*C.E.P.B.*

11–104 551.555.3

*§Streiff-Becker, R., **Neue Untersuchungen über Föhn in den Schweizer Alpen.** [Recent investigations on föhn (wind) in the Swiss Alps.] *Schweizerische Naturforschende Gesellschaft Denkschriften*, 74(4):244–278, Feb. 25, **1942.** 34 figs., 9 refs. **DLC**—A thorough and beautifully illustrated treatment of various aspects of föhn winds as observed and recorded in the Alps. Statistics for the canton of Glarus are analyzed for the period 1864–1939, and for other places for shorter periods. Individual cases of various types of föhn are subjected to synoptic-aerological and statistical analysis. The summer föhn, southwest föhn, high pressure föhn and dynamics of the föhn, are discussed separately. Changes in temperature, humidity, wind, pressure, cloudiness and visibility are shown by means of reproductions of automatic records or by cross sections. Pulsating föhns and those producing dust falls are also treated. Finally the effect on winds aloft and on cyclogenesis is discussed. *Subject Headings:* **Föhn winds Alps, Switzerland.**—*M.R.*

11–105 551.555.3

§Dallant, M., **Un effet de foehn, remarquable à Menton, le 7 avril 1949.** [A föhn effect remarkable at Menton on April 7, 1949.] *La Météorologie*, 4th Ser., No. 17:39–41, Jan.–March **1950.** 2 maps. Summaries in French, English and Spanish p. 39. Fontaine, P., **Essai d'étude, à l'echelle synoptique, du phénomène décrit ci-dessus.** [A synoptic study of the phenomenon described above.] *Ibid.*, p. 41–45. 5 charts, ref. **DWB, MH-BH**—Analyzed surface synoptic charts for 6 and 7 April 1949 show situation (northwest type) which produced a marked föhn in the Rhone Valley. Note by P. Fontaine shows more analyzed charts and upper air flow for same period and another set for April 26, 1949 (northerly type) which, though superficially the same as the former, resulted in cloudiness and thunderstorms in the Rhone Valley rather than in föhn conditions. *Subject Headings:* **Synoptic studies, Föhn winds, Rhone Valley, France.**—*M.R.*

11–106 551.555.4

Kreuder, A., **Moazagotl.** [Moazagotl.] *Zeitschrift für Meteorologie*, 3(11–12):361, Nov.–Dec. 1949. 2 refs. **DLC**—Topographical features causing valley wind of Upper Engadine described. *Subject Headings:* **Katabatic winds, Moazagotl, Upper Engadine, Switzerland.**—*C.E.P.B.*

EFFECTS OF WIND

11–107 551.515:551.556:551.46

§Arthur, Robert S., **Wave and weather correlation at Apra Harbor, Guam, M. I. from 1 June to 30 November, 1949.** University of California, Scripps Institution of Oceanography, ONR Contract N6 ori-111 Task VI. [Berkeley], **1950.** 6 leaves. 3 figs., 3 refs. [*Scripps Institution Technical Report of June 6, 1950, Wave Report* No. 96.] **DPL**—Five situations were studied, three of which involved wind waves or swell from typhoons, and two involved cyclones more than 1,000 miles from Guam. The computed build up and decrease in wave heights agree with observations. More wind data are needed from typhoon areas, however, if heights of damaging waves are to be forecast accurately. When waves reach Guam with little or no decay from typhoon areas, the periods are much longer than forecast. *Subject Headings:* **Atmospheric disturbances, Wind waves, Forecasting wave damage, Guam.**—*M.R.*

11–108 551.509.3(26) 551.556:532.593

§Blot, C., **La prévision météorologique de l' "État de la mer."** [Meteorological forecast of the "state of the sea."] *La Météorologie*, 4th Ser., No. 17:19–28, Jan.–March **1950.** 7 figs., table. Summaries in French, English and Spanish p. 19. **MH-BH**—A brief, instructive article on *meteo-hydrography* (the author's term for the science of wind waves at sea). After a discussion of the theory and the parameters to be observed, an example of a forecast made from

synoptic charts of the North Atlantic (June 21–22, 1949) is given and the verification discussed. *Subject Headings:* **Wave forecasting, Wind waves, Hydrography, Marine forecasting.**—*M.R.*

11–109 551.556:551.465

Chatley, Herbert, **Water currents due to wind.** *Engineering, London*, 169(4380):19, Jan. 6, **1950.** ref. **DLC**—Brief, theoretical discussion of effect of wind direction and force on movement of water or floating bodies. *Subject Headings:* **Wind driven currents, Hydrodynamics.**—*M.R.*

11–110 551.556:551.461.2

§Hela, Ilmo, **On the stress of the wind on the water surface.** *Geophysica, Helsinki*, 3:146–161, **1948.** 13 figs., 3 tables, 10 refs., 10 equations. **MH-BH**—The author presents a graph which illustrates the frequency (duration percentage) of the rates of water level variations on the Finnish coast and from which the frequency of the rates of variation at other points on the coast can be calculated by interpolation. The automatic recording Renqvist-Witting tide gage is illustrated and its mode of operation is described. The effect of wind and atmospheric pressure upon the height of water level is analyzed. An empirical formula is derived by means of which the slope of the sea level can be determined from the wind velocity and the depth of the sea area, especially for the case where the depth of the sea is considerably smaller than the so-called frictional depth. *Subject Headings:* **Wind effects, Storm tides, Tide gages, Finland.**—*I.L.D.*

11–111 551.556:532.59:551.46

Johnson, J. W., **The characteristics of wind waves on lakes and protected bays.** *American Geophysical Union, Transactions*, 29(5):671–681, Oct. **1948.** 11 figs., 4 refs., equations. **DWB**—*Subject Headings:* **Wind waves, Lakes, Oceanography.**

11–112 551.556:551.46:532.59

Johnson, J. W., **Relationships between wind and waves, Abbotts Lagoon, California.** *American Geophysical Union, Transactions*, 31(3):386–392, June **1950.** 8 figs., 6 refs., 2 equations. **MH-BH**—Observations were made on wind generated waves in order to determine the characteristics of waves and winds in relatively small bodies of water of limited fetch. The experimental procedure is described. The relationship between wave height and period, under conditions where the wave characteristics are controlled by fetch but not by wind duration, is represented as a function of fetch and wind velocity by the following equations: $gH^2/U^2 = f'(gF/U^2)$ and $gT/U = f''(gF/U^2)$. Other information presented includes a relationship between wave steepness and wave age, wind gradients and a typical frequency distribution of wave heights. *Subject Headings:* **Wind waves, Hydrodynamics, California.**—*I.L.D.*

11–113 551.556:551.46:532.59

Munk, Walter H., **A critical wind speed for air-sea boundary processes.** *Journal of Marine Research*, 6(3):203–218, **1947.** 8 figs., 4 plates, 4 tables, 23 refs., 12 equations. **DLC**—This article deals with the discontinuities or abrupt changes manifested by various processes at the air-sea boundary when the wind velocity is about 7 m./sec. The phenomena considered are the formation of whitecaps, soaring of birds, change in the resistance coefficient, the convection pattern and the behavior of waves generated experimentally in the laboratory. The turbulence model of Rossby and Montgomery is discussed. The changes in the oceanographic and meteorologic processes involving the air-sea boundary are explained by means of the Kelvin-Helmholtz instability criterion which involves the transition from laminar to turbulent flow and which gives instability for wind speeds exceeding 6.5 m./sec. *Subject Headings:* **Wind waves, Hydrodynamics.**—*I.L.D.*

11–114 551.556:551.465

von Arx, William S., **The circulation systems of Bikini and Rongelap Lagoons.** *American Geophysical Union, Transactions*, 29(6):861–870, Dec. **1948.** 8 figs., 5 tables, 5 refs. **DWB**—*Subject Headings:* **Wind effects, Ocean currents, Bikini.**

UPPER AIR WINDS

11–115 551.557:551.588.2:629.13

*Eichenberger, W., (ed.), **Camp d'aérologie alpine des Rochers-de-Naye 1939. Rapport de la Commission d'Aérologie Alpine.** [Alpine aerological base-camp at Rochers-de-Naye 1939. Report of the Alpine Aerological Commission.] *Schweizerische Naturforschende Gesellschaft, Denkschriften*, 74(5):279–332, May 25, **1943.** 56 figs., numerous tables, 10 refs. **DLC**—Two aerological camps were established in the passes of the Alps during 1938 and 1939 to determine the nature of the air current in these mountains for the use of aviation interest. Temperature gradients are determined from a series of stations at various elevations and also from airplane soundings to 6000 m. at Lausanne, and to 2000 m. at Rochers-de-Naye, and the results obtained from the two methods compared. Air currents are studied by means of captive balloons, pilot balloons, cloud observations and observations of smoke ejected from a nozzle. Finally, microclimatic temperature studies were made on the valley floor. The monograph is elaborately illustrated with photographs, adiabatic diagrams, etc. *Subject Headings:* **Upper air winds, Micrometeorology, Aviation meteorology, Orographic effects.**—*M.R.*

11–116 551.557:629.13

*Great Britain. Meteorological Office. **Equivalent headwinds on some of the principal air routes of the world.** London, H. M. Stationery Office, **1950.** 19 p. 2 figs., (12 p.) tables. (*Meteorological Reports* No. 7.) At head of title: M. O. 535b. **MH-BH**—An equivalent head (or tail) wind is the uniform wind along an air route which results in the same average ground speed as that actually attained. Tables give for each season head winds at 10,000, 20,000, 30,000 and 40,000 feet for 120 routes. Standard deviations are given with a table for calculating winds exceeded on any proportion of days. *Subject Headings:* **Upper air winds, Aviation climatology.**

11–117 551.557:551.588.2

§Misme, M., **Formation d'une dépression dynamique sous le vent d'une île isolée.** [Formation of a dynamic depression in the lee of an isolated island.] *La Météorologie*, 4th Ser., No. 15:166–172, July–Sept. **1949.** 4 figs. Summaries in French and English p. 166. **MH-BH**—By adding the vectors obtained from the existing gradient winds (trades), thermal winds (land-sea breezes) and local eddies, the author obtains the theoretical surface wind which checks successfully against the observed winds for Fogo. This study is based on observations made during two days in October 1948 on the frigate Leverrier while in the vicinity of the Cape Verde Islands. *Subject Headings:* **Orographic effects, Local winds, Fogo, Cape Verde Islands.**—*M.R.*

11–118 551.588.2:551.557

Radok, U., **Report on a flight investigation of lee wave disturbances near Melbourne.** *Weather Development and Research Bulletin*, No. 15:28–39, June **1950.** 4 figs., 3 tables, 7 refs. **MH-BH**—Horizontal flights in aircraft at altitudes from 3000 to 10,000 feet during strong easterly winds across the Dandenong ranges indicated evidence of wave like disturbances in their lee, with a particularly marked region of descending air directly over the ridge. In one case this region coincided with a marked positive temperature anomaly. With the exception of fairly low altitudes the observed vertical velocities do not agree with those to be expected according to the theoretical analysis of the lee wave phenomenon by Queney and Lyra. The verification of Scorer's theory is inconclusive because of difficulties of calculating a certain dynamic characteristic of the air stream from the available upper wind observations. *Subject Headings:* **Orographic effects, Upper air winds, Atmospheric disturbances, Australia.**—*I.L.D.*

AQUEOUS VAPOR AND HYDROMETEORS

WATER VAPOR AND CLOUDS

11–119 551.571.31

Brierley, J. M., **Extremes of humidity.** *Meteorological Magazine, London*, 79(934):120, April **1950.** table. **MH-BH**—A low relative humidity of 14% (6.0 mb. vapor pressure) and a

high vapor pressure of 19.9 mb. were recorded at Swimbridge, Devon, during July 1949. A vapor pressure of 22.9 mb. had been recorded by the author in July 1938 in Somerset. *Subject Headings:* **Humidity extremes, England.**—*M.R.*

11–120 551.573

*Göhre, K., **Beitrag zur Verdunstung zu verschiedenen Tageszeiten und bei verschiedenen Witterungseinflüssen.** [Contribution to evaporation at different times of day and under different weather influences.] *Zeitschrift für Meteorologie*, 3(10):289–293, Oct. **1949.** 5 tables. **DLC**—Tables give monthly values of evaporation at Eberswalde from bare soil, meadow and pine wood. For summer, measurements are given for 8–14 h., 14–20 h. and 20–8 h., the greater part of the evaporation occurring between 8 and 14 h. Means are given for groups of days with different cloud, rain and wind conditions. Greatest evaporation occurs with small cloud and strong wind. Owing to transpiration, loss from meadow and pine wood is several times that from bare ground. *Subject Headings:* **Evaporation, Eberswalde, Germany.** —*C.E.P.B.*

11–121 551.573

Simojoki, Heikki, **On the evaporation from the northern Baltic.** *Geophysica, Helsinki*, 3:123–126, **1948.** table, 7 refs., 7 equations. **MH-BH**—Jacobs' modification of Sverdrup's formula for evaporation of water from the sea is used to study evaporation from the northern Baltic. Evaporation is at a maximum in autumn when cold air comes into contact with the comparatively warm water and is at a minimum in early summer when the water is relatively cold in comparison with the air. The mean annual evaporation is 512 mm. In order to calculate evaporation of water in the northern Baltic, the author adopts 0.110 as the value for K instead of 0.108, used by Jacobs. *Subject Headings:* **Evaporation, Baltic Sea.**—*I.L.D.*

11–122 551.573:551.579

Sirén, Allan, **Die Bestimmung der Verdunstung und ihrer Einwirkung auf die Wasserläufen** (*sic*) **von Finnland.** [Determination of evaporation and its influence upon the waterways of Finland.] *Geophysica, Helsinki*, 3:162–172, 1948. 6 figs., 2 tables, 10 refs., 4 equations. **MH-BH**—The author has calculated a thirty year mean of precipitation and evaporation from land for forty stations in Finland. It is concluded that evaporation from land is independent of the size of precipitation area, that no relationship exists between evaporation and percentage of lakes, that precipitation slightly increases evaporation. A method for determining the monthly course of evaporation and an empirical equation for calculating the monthly evaporation for the summer months are presented. There is also a map illustrating the distribution of mean annual evaporation from land for the period 1911–1940. *Subject Headings:* **Evaporation, Hydrology, Finland.**—*I.L.D.*

11–123 551.574.1

†Junge, Christian, **Das Wachstum der Kondensationskerne mit der relativen Feuchtigkeit.** [The growth of condensation nuclei with relative humidity.] *Annalen der Meteorologie*, 3(5–6):129–135, **1950.** 4 figs., 2 tables, 20 refs., equation. Summaries in German and English p. 129. **MH-BH**—A useful summary of the literature. Growth of nuclei and formation of haze begins with R.H. about 70% and increases rapidly above 96% (formulas quoted). In most aerosols mixed nuclei predominate. The proportion of charged to uncharged nuclei also depends on humidity. Growth curves are modified by presence of impurities, illustrated by curves for HCl. Variations of visibility below 70% are attributed to varying solubility of nuclei. Dry fogs in industrial regions are attributed to oxidation of SO_2 (following Aitken). *Subject Headings:* **Condensation nuclei, Visibility.**—*C.E.P.B.*

11–124 551.574.1

Ludlam, F. H. and Wexler, R., **The growth of ice particles in cumulonimbus.** *Weather*, 5(7):262, July **1950.** 2 refs. **DWB**—Hail and heavy rain due to rare ice nuclei effective at −5°C. *Subject Heading:* **Condensation nuclei.**

11–125 551.574.1:551.510.42

Hess, Victor F., **On the concentration of condensation nuclei in the air over the North Atlantic.** *Terrestrial Magnetism and Atmospheric Electricity*, 53(4):399–403, Dec. **1948.** 2 tables, 10 refs. **DWB**—*Subject Headings:* **Condensation nuclei, North Atlantic Ocean.**

11–126 551.574.1

Ohta, S., **Investigations on condensation nuclei (Abstract) I-IV.** *Geophysical Magazine, Tokyo*, 21(3):208–214, March **1950.** 5 figs., table. **MH-BH**—An improved nucleus counter of Aitken type nuclei is described and diagrams showing its construction are presented. The following topics are discussed: the significance of the wall effect of a nucleus counter, the vertical distribution of condensation nuclei at various heights on Mt. Fuji, and the contents of condensation nuclei and uncharged nuclei over the Pacific Ocean and the Japan Sea. *Subject Headings:* **Condensation nuclei, Nuclei counters, Japan, Pacific Ocean.**—*I.L.D.*

11–127 551.576.1

Davies, D. R., **The lateral diffusion of a cloud of falling droplets.** *Cambridge Philosophical Society, Proceedings*, 46(3):500–507, July **1950.** 3 figs., table, 2 refs., equations. **DLC**—The author applies O. G. Sutton's theory of eddy diffusion, developed for the dispersion of gases or fine air-borne suspensions from point and line sources situated near ground level, to predicting the dispersion of a cloud of falling droplets released from a point source at heights of a 1000 to 5000 feet above the earth. The mathematical theory is developed; no allowance has been made for the inertia effect, for the fact that the turbulence due to wake of the drops influences the motion of the individual drops and for evaporation from drop surfaces. Experimental and theoretical values are given for the widths of ground area covered by liquid drops released from sources situated at heights between 1000 and 5000 feet. *Subject Headings:* **Cloud physics, Drop diffusion.**—*I.L.D.*

PRECIPITATION

11–128 551.577:551.515.8

§König, W., **Über die Niederschläge der Kaltluftinseln.** [On precipitation of cold air islands.] *Zeitschrift für Meteorologie*, 3(11–12):321–325, Nov.–Dec. **1949.** 12 synoptic charts. **DLC**—Islands of cold air in troposphere bring worse weather over western and central Europe than would be expected from surface charts alone. Besides instability showers and prefrontal thunder, persistent rain is frequent from the adjacent warm air displaced by the cold, owing to active or passive upglide or occasionally to wave disturbances. Charts show relative topography 500–1000 mb. and surface charts with precipitation areas on six selected days. *Subject Headings:* **Precipitation, Seclusions.**—*C.E.P.B.*

11–129 551.577

Schulze, Alfred, **Verschiedene Darstellungsgrössen des Niederschlages mit Beispielen aus dem Ostdeutschen Raum.** [Different representative magnitudes of precipitation with examples from the East German area.] *Meteorologische Rundschau*, 3(7–8):164–167, July–Aug. **1950.** table, 18 refs. **DWB**—Annual means show influence of topography. Monthly means often show type of distribution different from annual. Relative monthly means (ratio to annual mean/12) and relative excess characterize annual variation. Relative pluviometric coefficient (difference of percentages, wet and dry months) shows departure from uniformity. Sums and differences of absolute and relative monthly means are useful for comparison with vegetation. Annual variability given by mean deviation of annual totals in percent. Absolute and mean monthly extremes, excessively wet and dry months and precipitation frequency also defined. *Subject Headings:* **Precipitation variations, Precipitation extremes, East Germany.**—*C.E.P.B.*

11–130 551.577.35

Loewe, F., **Über Gebiete extrem hoher Veränderlichkeit des Jahresniederschlages.** [On regions of extremely high variability of annual precipitation.] *Annalen der Meteorologie*, 3(5–6):170–171, **1950.** 11 refs. **MH-BH**—Quotes a number of stations where the relative variability of rainfall is much higher than that given by Conrad's formula. *Subject Heading:* **Precipitation variations.**—*C.E.P.B.*

11–131 551.577.38(44)

*Sanson, J., **La sécheresse remarquable de la période 1941–1949 en France.** [The remarkable drought of 1941–1949 in France.] *La Météorologie*, 4th Ser., No. 17:1–18, Jan.–March **1950.** 2 figs., 13 tables. Summaries in French, English and Spanish p. 1. **MH-BH**—The rainfall deficit which occurred throughout France during the entire agricultural year 1948–1949, reaching its peak in the summer of 1949, is considered to be a continuation of the long period of drought which began in September 1941. Other notable droughts during this period were April 20–June 5, 1944 and Aug. 25 to Oct. 20, 1947. The only long interruption during this eight year period was from July 1944 to January 1945. Effects of the prolonged drought on water supply for power, agriculture, economy, etc., are mentioned. Numerous comprehensive tables are included to show relative amounts of precipitation in the Alps, Pyrenees, Massif Central, North Africa and along the English Channel, and at the important metropolitan centers of France. At Paris the year 1948–49 was the driest in 45 years and the warmest in 77 years. Evaporation was excessive, especially in the summer and sunshine hours abnormally great. North Africa, on the other hand, had unusually abundant rainfall during this period. *Subject Headings:* **Droughts, Precipitation distribution, France, North Africa.**—*M.R.*

11–132 551.577.51

Rossmann, F., **Über die Verteilung des Niederschlags an der Erdoberfläche.** [On the distribution of precipitation over the earth's surface.] *Meteorologische Rundschau*, 3(7–8):162–163, July–Aug. **1950.** 5 refs., equation. **DWB**—In opposition to the accepted view that the increase of rainfall with height is due to forced ascent of air by slopes, author considers that it is due to the smaller evaporation of falling rain in the shorter air path between cloud and hill than between cloud and plain. Increase of rain with height greatest in winter when clouds are lowest, droplets smallest and wind strongest. *Subject Headings:* **Precipitation distribution, Topographic effects.**—*C.E.P.B.*

11–133 551.578.1

Fletcher, Robert D., **A relation between maximum observed point and areal rainfall values.** *American Geophysical Union, Transactions*, 31(3):344–348, June **1950.** 4 figs., ref., 6 equations. **MH-BH**—The relationship between depth of rainfall and duration, obtained by plotting world record point rainfall values against durations ranging from a few minutes to six months is approximated by an equation in which maximum depth is directly proportional to the square root of duration: $R = k\sqrt{D}$. The validity of this equation declines with increasingly smaller areas. The factor of proportionality k, is a hyperbolic function of area when maximum depth of rainfall over duration is plotted against areas ranging from a point to 200,000 sq. mi. The empirical equation $R = \sqrt{D}[a + b/(\sqrt{A} + C)]$ relates maximum depth to area and duration and holds for a restricted range of the latter. *Subject Headings:* **Rainfall distribution, Rainfall depth duration frequencies.**—*I.L.D.*

11–134 551.578.11:621.396.9

Austin, Pauline M. and Foster, Harrie E., **Note on comparison of liquid water content of air with radar reflectivity.** *Journal of Meteorology*, 7(2):160–161, April **1950.** fig., 6 refs. **DWB, MH-BH**—Radar reflectivity varies with type of precipitation, as well as liquid water content, as shown by scatter diagram of a large number of measurements made during 1947–1949 at Mass. Inst. of Technology. *Subject Headings:* **Water content of air, Radar echoes.**—*M.R.*

11–135 551.578.11

Teich, M., **Bemerkungen über die Wettererscheinung der "Nieselschauer."** [Remarks on the weather phenomenon "drizzleshower."] *Zeitschrift für Meteorologie*, 3(11–12):358–359, Nov.–Dec. **1949. DLC**—Observations on meteorological flights over northern seas. Phenomenon is peculiar to seas in center or east of anticyclones, in very dense low St.-Cu. Visibility only a few hundred meters. Diameter of showers 2–5 km. with vague boundaries. Size of drops decreases upwards. *Subject Heading:* **Drizzle.**—*C.E.P.B.*

11–136 551.578.11

Virgo, S. E., **Tropical rainfall from cloud which did not extend to the freezing level.** *Meteorological Magazine, London*, 79(938):237–238, Aug. **1950. MH-BH**—Describes cases of rainfall in West Indies in which showers fell from cumulus and strato-cumulus thousands of feet below freezing level. *Subject Headings:* **Rainfall, Zero isotherm, West Indies.**

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATE OF PARTICULAR PLACES

11–137 551.582(94)

*Loewe, F., **"Difficult days" at Melbourne.** *Weather Development and Research Bulletin*, No. 15:12–27, June **1950.** 16 tables. **MH-BH**—The author discusses the meteorological factors responsible for the occurrence of different types of "difficult" days in Melbourne and analyzes the characteristics of temperature, relative humidity and wind whose interaction brings about "difficult" days. *Subject Headings:* **Climatology, Melbourne, Australia.**—*I.L.D.*

11–138 551.582(467)

†*Serra, Antonio, **Contributo alla climatologia delle Baleari.** [Contribution to the climatology of the Balearics.] *Rivista di Meteorologia Aeronautica*, 9(4):3–18, Oct.–Dec. **1949.** 4 figs., 11 tables, 13 refs. Summaries in Italian, French, English and German p. 3–4. **MH-BH**—Upper air wind data made at Palma (1938–1939) and Alcudia (1934–1936) have been summarized and Baillie type wind roses and data presented for various levels. Comparison with data for Barcelona and Minorca indicates that local influences affect the winds at Palma and Alcudia up to 2000 m. above sea level. Data on cloudiness, visibility and fog are also presented and discussed. *Subject Headings:* **Climatology, Upper air winds, Balearic Islands.**—*M.R.*

11–139 551.582.2(699.2)

*Loewe, F., **Das Klima von Tristan da Cunha.** [The climate of Tristan da Cunha.] *Meteorologische Rundschau*, 3(7–8):147–149, July–Aug. **1950.** 2 tables. **DWB**—Table summarizes regular 24-hourly observations 1943–1947 in this lonely southern island; cold, rainy and windy. *Subject Headings:* **Climatology, Tristan da Cunha, South Atlantic Ocean.**—*C.E.P.B.*

CLIMATIC CHANGES

11–140 551.583.14(52):523.74

Yamamoto, T., **The secular change of the climate in Japan. I.** *Geophysical Magazine, Tokyo*, 21(3):249–268, March **1950.** 13 figs., 13 tables. **MH-BH**—Annual range of air temperature in Japan has increased by about 2°C. since 1900; precipitation has increased in winter and decreased in summer. Correlations are found between temperature range and sunspot numbers (+), Siberian high (−), and intensity of Aleutian low. Smoke of large towns has increased winter night temperatures. *Subject Headings:* **Climatic changes, Sunspots, Japan.**—*C.E.P.B.*

11–141 551.583.2:551.465(266)

Arrhenius, Gustaf, **Late cenozoic climatic changes as recorded by the equatorial current system.** *Tellus*, 2(2):83–88, May **1950.** 2 figs., 11 refs. **MH-BH**—Investigations of sediment cores obtained from the bottom of the eastern Pacific during the Swedish Deep Sea Expedition (1947–1948) show that such cores are ideal for the study of long term climatic changes as reflected by changes in the equatorial current system. A periodicity is evident during the late Pliocene and Pleistocene which, with further study, should reveal some of the details of the late Cenozoic climate. A cross section along the 130th meridian (W) from 20°N to 20°S shows the areas of upwelling and convergence, and the application to the theory of the current systems in the East Pacific. *Subject Headings:* **Climatic changes, Paleoclimates, Ocean currents, East Pacific.**—*M.R.*

11–142 551.583.3:551.513

Viete, Günter, **Ueber die allgemeine atmosphärische Zirkulation während der diluvialen Vereisungsperioden.** [General circulation of atmosphere during the diluvial glacial periods.] *Tellus*, 2(2):102–115, May **1950.** 34 refs. Summary in English p. 102. **MH-BH**—Effect of southerly border of North Polar Ice Shield during the periods of glaciation would be to increase the general circulation over the border regions. Evidence that the contrary is true (weakened circulation) can only be explained by a decrease in insolation during those epochs. Various theories about circulation conditions in various regions of the Northern Hemisphere are examined critically both in respect to the effect of the *ice* on the circulatory *exchange of air* and to the effect of a *change in circulation* on the *formation of ice* shields. *Subject Headings:* **Climatic changes, General circulation, Glacial periods.**—*M.R.*

BIOCLIMATOLOGY—APPLIED CLIMATOLOGY

11–143 551.515.8:551.586:612

Becker, Friedrich, **Wetteranalyse und Bioklimatologie.** [Weather analysis and bioclimatology.] *Deutscher Wetterdienst in der US-Zone, Berichte*, No. 12:117–121, **1950.** 10 figs. **MH-BH**—It has been found necessary to extend statistical methods of investigation of weather stimuli on the vegetative nervous system by continuous analyses of weather sequence. The 10 figures show graphically for periods up to 24 hours at Königstein: weather type, air mass, weather phenomena, period of sunshine, wind, curves of pressure, temperature, cooling power, vapor pressure, relative humidity, wind speed and global radiation, visibility. Clinical data are superposed but not explained. Provisional results show atmospheric stimulation on average 1.2 times a day. *Subject Headings:* **Medical meteorology, Nervous system.**—*C.E.P.B.*

11–144 551.586

Seilkopf, Heinrich, **Zur synoptischen und zur klimatischen Seite der medizinischen Meteorologie.** [On the synoptic and climatic phases of medical meteorology.] *Annalen der Meteorologie, Medizin-meteorologische Hefte*, (3):29–33, **1950.** 2 figs., 5 refs. **MH-BH**—Since November 1949 weekday weather discussions with doctors have been held in Hamburg. Movements of warm and cold air masses shown by relative topography, general weather types and changes of weather are important medically and are treated regionally but with allowance for regional peculiarities, e.g. coast or inland. Such local differences are in part climatic. Climatology can be based on means and frequencies but a necessary wider application is through synoptic climatology. *Subject Headings:* **Medical meteorology, Synoptic climatology.** —*C.E.P.B.*

11–145 551.586 551.508.98

Wachter, Heinz, **Physikalische Überlegungen zur Abkühlungsgrösse.** [Physical reflections about cooling power.] *Deutscher Wetterdienst in der US-Zone, Berichte*, No. 12:128, **1950.** equations. **MH-BH**—Remarks on the principles of instruments for measuring cooling power. *Subject Headings:* **Bioclimatology, Frigorimeters.**—*C.E.P.B.*

11–146 551.586:061.4:016

†*Germany. Deutscher Wetterdienst in der US-Zone, **Führer durch die Ausstellung "Klima und Mensch."** [Guide to the exhibition "Climate and Man."] *Berichte*, No. 12:13–19, **1950.** 36 refs. **MH-BH**—Gives detailed schedule of exhibition planned in Climatology Division of German Weather Service in the U. S. Zone. Bibliography of 36 recent works. *Subject Headings:* **Climatology, Exhibitions.**—*C.E.P.B.*

11–147 551.586:59

Pittioni, Bruno, **Die klimaökologische Formel als Hilfsmittel der biogeographischen Forschung.** [The climatic-ecological formula as an aid in biogeographical research.] *Wetter und Leben*, 2(7–8):161–167, Dec. **1949.** 31 refs. **MH-BH**—Dark forms of bumblebees occur in locally damp regions (melanism is generally favored by damp). Author expresses ecological

dampness by index:

$$I = \frac{N(t + 20)}{100(B + 100) - (H + 1000)}$$

N, precipitation, mm; t, mean temperature, °C.; B, latitude; H, height in meters. *Subject Headings:* **Bioclimatology, Apiculture.**—*C.E.P.B.*

11–148 551.586:599.9

Berg, H., Cauer, H., Courvoisier, P. et al., **Dr. Manfred Currys Bioklimatik; eine Diskussion.** [Dr. Manfred Curry's bioclimatics; a discussion.] Berlin, Verlag Urban und Schwarzenberg, **1949.** 32 p. **MH-BH**—Observations and theories presented by Dr. Manfred Curry in his **Bioklimatik** (Riederau/Ammersee, Oberbayern, 1946) (*see item* 4–134, *Meteorological Abstracts and Bibliography*, 1(4), April 1950) and **Über Ursachen und Bedeutung der Wettereinflüsse auf den Organismus.** [On causes and significance of influence of weather on the organism.] (*Ärtzliche Forschung*, (5–6):81, 1948, which is a reprint of "*Grenzgebiete der Medizin*") resulted in contributions by the following scientists on discussion of the subject: H. Lossnitzer, B. de Rudder, H. Berg, H. Flohn, P. Courvoisier, W. Mörikofer, F. W. P. Götz, H. Tichy, H. Schulze, H. Cauer, W. Schraml, A. Stühmer, K. Dirnagl and M. Curry. This "discussion" comprises a series of papers which in themselves are as worth-while contributions as the original—if not so elaborate. Mainly on Aran—effect of air masses on health, etc. *Subject Headings:* **Bioclimatology, Aran.**—*M.R.*

11–149 551.586:599.9

Über die Wettereinflüsse auf den gesunden und den kranken Menschen. [Weather influences on healthy and ill men.] *Wetter und Leben*, 2(5–6):114–126, Oct. **1949. DWB**—Summary and discussion of: Manfred Curry, **Bioklimatik.** American Bioclimatic Research Institute, Riederau/Ammersee, 1946. *Subject Heading:* **Bioclimatology.**—*C.E.P.B.*

11–150 551.586:61

§Woodworth, William C. and Wiseman, Richard D., **The hay fever season in New York City.** *Weatherwise*, 3(4):79, 88, Aug. **1950.** fig. **MH-BH**—Short article on current pollen investigation program in New York City, including discussion of weather conditions favorable for high concentration of ragweed pollen and a chart showing synoptic situation which gave the highest pollen count of 1949 (Sept. 1). *Subject Headings:* **Aerobiology, Medical meteorology, Pollen, Hay fever, New York City.**—*M.R.*

11–151 551.586:612

Effenberger, Ernst, **Einfluss des Wettergeschehens auf die Tonuslage des vegetativen Nervensystems.** [Influence of the weather sequence on the muscular state of the vegetative nervous system.] *Annalen der Meteorologie, Medizin-meteorologische Hefte*, (3):10–20, **1950.** 2 figs., 14 refs., equation. **MH-BH**—Questions discussed: what meteorological factors cause meteorotropic stimulus; where does the stimulus occur and of what type are the reactions? After discussing the theory of the stimulating action of weather changes on the vegetative nervous system, author describes experiments on seven volunteers by injections of "sympatol" and measurement of subsequent blood pressure and pulse for 5 minutes. The mean blood pressure is plotted daily from February 11, 1950 to April 3, 1950 against air mass, humidity, temperature, pressure, radiation, sunspot number, magnetic character and oxidation value. A relation between reaction of the nervous system and weather changes, especially to passage of warm and cold sectors, was found in all subjects but there are no definite relations to any one element. *Subject Headings:* **Medical meteorology, Nervous system.**—*C.E.P.B.*

11–152 551.586:615.8

Jungmann, Horst, **Der Einfluss des Seeklimas auf die Funktion der Haut.** [The influence of the marine climate on the function of the skin.] *Annalen der Meteorologie, Medizin-meteorologische Hefte*, (3):7–9, **1950.** 19 refs. **MH-BH**—Reactions of the skin are numerous and complex and affect the whole organism, especially through the capillaries. Individual factors are hard to isolate. The effect of pigmentation is obscure. Reference is made to 19 papers (without titles). *Subject Headings:* **Medical meteorology, Skin functioning.**—*C.E.P.B.*

11–153 551.586(436):615.8

Lauscher, Friedrich, **Vom Winterklima österreichischer Kurorte.** [On the winter climate of Austrian health resorts.] *Wetter und Leben*, 2(11–12):241–248, June **1950.** 5 figs., 2 tables. **MH-BH**—The main climatic boundary in central Europe in winter is horizontal, at about 700 meters. Above this weather is clear and sunny; below, cloudy and foggy. Effect of sunshine increased by snow surface. Hill's cooling power calculated from wind and temperature (mean chart for Jan.!) shows that exposed places above 500 m. experience excessive cooling but sheltered mountain valleys are mild and stimulating. The winter climate of the Alps is unique in Europe. *Subject Headings:* **Climatotherapy, Austria.**—*C.E.P.B.*

11–154 551.586:616

Sundermann, A. and Baufeld, H., **Veränderungen des Wachstums der Streptokokken in der Mundhöhle in Abhängigkeit von meteorologischen Bedingtheiten und ihre Beziehungen zu akuten Infekten des Rachens und der Nebenhöhlen.** [Changes in the growth of streptococci in the mouth cavity as dependent on meteorological conditions and their relation to acute infections of the throat and neighboring cavities.] *Annalen der Meteorologie, Medizinmeteorologische Hefte*, (3):21–28, **1950.** 9 figs., 22 refs. **MH-BH**—Author adduces evidence that variations in growth of bacteria are related to weather factors through changes in the mucous membrane of the mouth. However, as the vascular functions depend on the vegetative nervous system, the latter must be the "receiver" of the meteorological influences. The simultaneous noncyclic appearance and disappearance of different types of streptococci suggest phase changes under varying conditions of growth. Under certain conditions harmless symbiotes can become aggressive and cause or prepare the way for disease. *Subject Headings:* **Medical meteorology, Streptococci.**—*C.E.P.B.*

11–155 551.586:63(52)

†*Nuttonson, Michael Y., **Agricultural climatology of Japan and its agro-climatic analogues in North America.** Washington, D. C., American Institute of Crop Ecology, **1949.** 20 p. map, fold. chart, 4 tables, 21 refs. (*International Agro-climatological Ser.*, No. 9.) **MH-BH**—The general geography and climate of Japan are described. Data on mean monthly temperature, relative humidity and precipitation, on absolute temperature, on average killing frost dates, duration of average frostless season and on precipitation effectivity indices are presented for 150 meteorological stations. A list of climatically analogous North American meteorological stations and their locations are given. *Subject Headings:* **Ecoclimatology, Agricultural climatology, Japan.**—*I.L.D.*

11–156 551.586:636

*Dordick, Isadore L., **The effect of high temperature and humidity upon cattle.** *Acta Tropica*, 6(3):221–245, (**1949**). tables, 33 refs. Summaries in English, French and German 243–245. (Reprint available.) **MH-BH**—Different breeds of cattle show different responses to changes in temperature, especially with regard to respiration rate, rectal temperature, pulse rate and fertility. The effect of increasing vapor pressure has not been considered carefully by most writers, but is more important than changes in relative humidity. Difficulties arise in isolating the effect of temperature, absolute humidity and radiation (sunshine) when using average data recorded under natural conditions. Comparison of European breeds with breeds native to the tropics show the greater response of the former to high temperatures than the latter. Jersey cattle show superior heat tolerance to Holstein in both hot dry and hot humid climates. *Subject Headings:* **Agricultural meteorology, Animal husbandry, Bioclimatology.**—*M.R.*

11–157 551.587(481)

*Johansen, Harald, **Mean upper air data obtained from soundings at Tromsö during the years 1941–44.** *Geofysiske Publikasjoner*, 17(4), **1949.** 28 p. 16 figs., 12 tables, 15 refs. **MH-BH**—From data obtained at Tromsö during 1636 radiosonde ascents made between May 1941 and October 1944 by the German Air Forces. Mean monthly and annual pressures; actual, potential and equivalent potential temperatures; lapse rates; relative and specific humidities are calculated for each standard level up to 25 km. Methods of calculating and smoothing are

discussed; results at Tromsö compared with those from Abisko, and afternoon soundings made during 14 months compared with early morning soundings to show the radiation error in the former. The average height of the tropopause varied from 8.8 gkm. (March) to 10.1 gkm (July and August), a range of only 1.3 km. Many carefully drawn isopleth charts and detailed tabular data makes this a model monograph on upper air climatology. *Subject Headings* **Upper air climatology, Tromsö, Norway.**—*M.R.*

MISCELLANEOUS APPLICATIONS

SOLAR INFLUENCES

11–158 551.509.**33**:551.590.**21**:523.7

Baur, Franz, "**Zurückführung des Grosswetters auf solare Erscheinungen.**" ["Dependence of large scale weather on solar phenomena."] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 2(2–3):342–344, **1950.** table, 4 refs. **DWB, MH-BH**—The author gives additions and corrections to his work printed in above periodical in 1949, Ser. A, 1(3–4). *Subject Headings:* **Long range forecasting, Solar influences, Sunspots.**

11–159 551.590.**21**:551.583.**1**:523.7

Stranz, Dietrich, **Sonnenflecken und Wetter.** [Sunspots and weather.] *Meteorologische Rundschau*, 1(11–12):339–342, May–June **1948.** fig., 3 tables, 10 refs. **DWB**—*Subject Headings:* **Sunspots, Climatic variations.**

11–160 551.590.**21** 551.311.12:523.74(798

†Lawrence, Donald B., **Glacier fluctuation for six centuries in southeastern Alaska and its relation to solar activity.** *Geographical Review*, 40(2):191–223, April **1950.** 18 figs., 44 refs. **DLC**—Glaciers in the Juneau region have retreated 1.3 to 5 miles since 1765, before which they seem to have advanced in unison from some time before 1300. Similar conditions have occurred in the Glacier Bay, British Columbia and the Mt. Hood glacier fields. The accelerated retreat of all except Taku Glacier (which has advanced since 1900) during the past 75 years is attributed to increased solar activity—the advance up to 1765 to a dearth of sunspots for several hundred years. Many excellent photographs and charts of glaciers, and several periodograms relating glacial events to solar cycles, are included. *Subject Headings:* **Glaciers, Sunspots, Alaska.**—*M.R.*

OPTICAL PHENOMENA

11–161 551.593.1

Courvoisier, L., **Astronomisch festgestellte Auswirkungen von Luftwogen.** [Astronomically determined effects of air waves.] *Meteorologische Rundschau*, 3(7–8):149, July–Aug. **1950. DWB**—At Basel author found regular variations of $\frac{1}{2}$–1″ in apparent height of star with a period of 60 sec. Attributed to waves of amplitude 22–120 m. at an inversion of 2°C. *Subject Headings:* **Scintillation, Optical phenomena.**—*C.E.P.B.*

11–162 551.593.5

Dufay, Maurice, **Recherches sur l'émission des bandes négatives de l'azote au crépuscule.** [Research on the emission from negative nitrogen bands at twilight.] *Annales de Géophysique*, 5(1):2–24, Jan. **1949.** 8 figs., 3 tables, 28 refs., 7 equations. **MH-BH**—The emission of negative bands of N_2^+ molecule is a daily phenomenon. The apparent altitude of emission is approximately 100 km. at a height of 10–20° above the horizon. The true altitude of emission is higher and is in the vicinity of the *E* region. The structure of the bands is in agreement with the hypothesis of optical resonance. The intensity of the bands varies from day to day. In general, a positive correlation exists between the intensity of the bands and magnetic disturbances. Since strong intensities can occur in the absence of magnetic disturbances it is likely that the emission of bands is associated with the sporadic ionization in region *E*, which is controlled by solar and meteoric phenomena. *Subject Headings:* **Twilight phenomena, Nitrogen bands, Magnetic storms.**—*I.L.D.*

11–163 551.593.55

Donitch, N., **Variations d'aspect de la lumière zodiacale observées le 24 mars 1946 à Tamanrasset (Hoggar, Algérie méridionale).** [Variations of the aspect of zodiacal light observed on March 24, 1946 at Tamanrasset (Hoggar, southern Algeria).] *Annales de Géophysique*, 5(2):167–170, Feb. 1949. 5 figs., ref. **MH-BH**—The author examines the problem as to whether the zodiacal light is a phenomenon partly due to the illumination of the upper atmosphere by the sun or is entirely one of cosmic origin. The intensity of the zodiacal light about its axis does not vary between two successive photographic images in spite of atmospheric changes. Hence the true form of the phenomenon must have remained constant. Although the zodiacal light has altered its aspect, the two images studied are identical. And the measured intensity of the nocturnal sky in the neighborhood of the zodiacal light is a phenomenon resembling the solar corona observed at Tamanrasset. *Subject Headings:* **Zodiacal light, Twilight phenomena, Algeria.**—*I.L.D.*

11–164 551.593.62

Walker, D., **A rainbow and supernumeraries with graduated separations.** *Weather*, 5(9):324–325, Sept. 1950. fig., 2 refs. **DWB**—Account of part of a rainbow in which angular separations of main and three supernumerary bows increased with height. Attributed to decrease in size of drops from base of bow to top of visible part. *Subject Heading:* **Rainbows.**

11–165 551.593.63

Maier, Wilhelm, **Kristallhalo.** [Ice crystal haloes.] *Zeitschrift für Meteorologie*, 4(4–5):111–119, April–May 1950. 9 figs., 6 refs. **DLC**—An analysis of the formation of haloes, illustrated by diagrams. Ice needles lying parallel form innumerable light cones tangential to a circle. If these intersect, light patches are formed. The Lowitz halo is derived from 5-armed crystals in a vertical plane, which breaks up the 22° halo into two intersecting haloes; if the crystals lie obliquely the Lea halo is formed. Parry's arc is the upper part of two symmetrical haloes. The contact arcs are reflected refraction haloes. A 44° halo with a dark center observed by author is attributed to ice prisms of varying rotation. Elliptic haloes are formed in an oblique lens of cold air. *Subject Headings:* **Haloes, Optical phenomena, Ice crystals.**—*C.E.P.B.*

11–166 551.593.64

Stranz, D., **Ein lichtstarker Beugungskranz.** [An intense diffraction corona.] *Zeitschrift für Meteorologie*, 3(11–12):360–361, Nov.–Dec. 1949. 2 refs. **DLC**—Observed May 22, 1949 at Askim, Sweden. Radius 2°, light minimum at 1.6°. Spectrum colors clear (greened). Attributed to uniform small smoke particles in subsiding air. *Subject Heading:* **Coronas.**—*C.E.P.B.*

11–167 551.593.7:551.510.42

Dahlkamp, V., **Beiträge zur Untersuchung des atmosphärischen Reinheitsgrades.** [Contribution to the investigation of atmospheric purity.] *Zeitschrift für Meteorologie*, 3(11–12):338–352, Nov.–Dec. 1949. 8 figs., 11 tables, 28 refs., 4 append. **DLC**—Fluctuations of the neutral points of Arago, Babinet and Brewster are closely related to the purity of the air. Author describes results of observations at Recklinghausen with the Voss polariscope using colored filters and gives curves of diurnal variation and tables of maximum and minimum height; relations with sun height are discussed. Decreasing amplitude between secondary maximum and minimum, and decreasing distance from antisolar point, are associated with increasing sky blue and visibility and decreasing vapor pressure. There is a marked displacement of secondary maxima with S and SW winds, due to smokier air. Appendices give mean observed solar distances of Arago and Babinet points, classified into three groups of different characteristics, in 1941 and 1942. *Subject Headings:* **Turbidity, Neutral points.**—*C.E.P.B.*

ELECTRICAL PHENOMENA

11–168 551.594

Godefroy, Alain, **Appareil enregistreur pour la mesure des résistances élevées et variables: application à la mesure de la conductibilité électrique de l'air.** [Registering apparatus for the

measurement of high and variable resistance: application to the measurement of electric conductivity of the air.] *Annales de Géophysique*, 5(2):164–166, **1949.** 3 figs., ref., equation **MH-BH**—This is a description of an apparatus for measuring high and variable resistances It can eliminate errors due to variations in the characteristics of the amplifiers needed for recording and it can measure resistances of 10^{14} ohms with a precision of one percent. A circuit diagram is given and the theory underlying the apparatus is presented. *Subject Heading:* **Atmospheric electricity instruments.**—*I.L.D.*

11–169 551.501.4:551.594

Lecolazet, Robert, **Nouvelles mesures du champ électrique atmosphérique en planeur** [New measurements of the atmospheric electric field by a glider.] *Annales de Géophysique* 5(1):84–86, Jan. **1949.** 3 figs., ref. **MH-BH**—The author describes a method for obtaining continuous and detailed measurements of variations in the vertical component of the electric atmospheric field by means of an apparatus, consisting of a single thread electrometer and a barograph installed in a glider. *Subject Headings:* **Atmospheric electricity measurements, Potential gradient, Gliders.**—*I.L.D.*

11–170 551.501.4:551.59

Molard, P. and Jolivet, J., **Mesures de charges électrostatiques faibles avec du matériel radio ordinaire ; application aux mesures d'électricité atmosphérique.** [Measurement of weak electrostatic charges with ordinary radio equipment for the purpose of measuring atmospheric electricity.] *Annales de Géophysique*, 5(1):86–88, Jan. **1949.** 2 figs. **MH-BH**—A method is described, whereby electrostatic charges of the order of magnitude of IUES, which occur during measurements of atmospheric electricity, can be measured by instantaneous reading of a mechanically produced record. The charge to be measured is applied by a condenser to the grid of a disconnected radio tube. The resulting impulse is amplified and measured by ballistic galvanometer. The circuit diagram is given. *Subject Headings:* **Atmospheric electricity measurements, Radio recorders.**—*I.L.D.*

11–171 551.594.1

Norinder, Harald and Siksna, Reinhards, **The measurement of the variation characteristics of the density of small-ions.** *Arkiv för Geofysik*, 1(1):1–32, **1950.** 48 figs., 24 refs. **DLC, MH-BH**—A detailed description of methods used in measuring ion density of surface air during a period of 16 days in December 1948 at the Institute for High Tension Research at Uppsala. An Ebert counter was used in connection with an aspirator device in a heated observation hut. All equipment is illustrated by means of diagrams and photographs, and the performance curves under different conditions are shown. The relation of the ion density to meteorological factors (snow, rain, wind direction, humidity and thunderstorms) is shown graphically. In general there is a rapid increase of positive ion density during a snowstorm, a gradual rise of negative ion density during a rain storm, and rapid variations of both ions during a thunderstorm (negative predominant). *Subject Headings:* **Ionization, Atmospheric electricity measurements.**—*M.R.*

11–172 551.594

Schonland, B. E. J., **The flight of thunderbolts.** Oxford, Clarendon Press, **1950.** Price 15s. 152 p. 33 figs., 6 plates. **MH-BH**—A well-written semipopular book on lightning and the electrification of thunder clouds. It begins with an account of the worship of thunder and magical ways of averting lightning. B. Franklin's early experiments and invention of the lightning rod are described. The next chapters discuss the forms of lightning, width of channel, St. Elmo's fire, flashes to aircraft, risks to life, buildings and trees, fulgurites and flashes to ground. The Boys camera is described and the luminous processes in the lightning flash explained in detail with photographs. Chap. 5 sets out modern views on the electrical processes involved in the pilot, leader and return strokes, and field studies of lightning. A full account is given of protection by lightning rods, accepting the 45° cone of protection. Theories of the electrification of thunder clouds by the separation of + and − charges are discussed, including that of the temporary support of masses of charged raindrops by electrical attraction

causing cloudbursts, also rainmaking and the development of a thunderstorm. Finally, a full account is given of sferics and the maintenance of the earth charge. *Subject Headings:* **Thunderstorm electricity, Lightning.**—*C.E.P.B.*

11–173 551.594.21

Küttner, Joachim, **Ist die Wolkenluft oder der Niederschlag Träger der Hauptladungen im Gewitter?** [Is cloud-air or precipitation the carrier of the main charges in thunderstorms?] *Meteorologische Rundschau*, 3(7–8):145–147, July–Aug. **1950.** fig., 18 refs., equation. **DWB**—From observations on Zugspitze, author found that direction of electric field and charge on precipitation are in most cases opposite. Positively charged rain falls out of a negative space charge and vice versa. Considers that not the rain but the cloud through which it falls is the carrier of the lower main charge. The thunder cloud is the negative end of a dipole, the positive end being in showers near the earth. The upper + charge is the upper part of a second (snow) dipole outside the region of heavy precipitation. The strongest fields lie between these two dipoles and most lightning in clouds is nearly horizontal. *Subject Headings:* **Thunderstorm electricity, Electricity of precipitation.**—*C.E.P.B.*

11–174 551.594.22

Ashmore, S. E. and Hoddinot, M. H. O., **Unusual lightning.** *Weather*, 5(9):331, Sept. 1950. **DWB**—Refers to J. B. Wright's letter in *Weather*, June 1950. Ashmore calls it "Flachenblitz." *Subject Heading:* **Lightning.**

RADIO METEOROLOGY

11–175 551.594.6

Israël, Hans and Sommermeyer, K., **Über partielle Reflexion elektromagnetischer Wellen in der Troposphäre.** [On the partial reflection of electromagnetic waves in the troposphere.] *Zeitschrift für Meteorologie*, 3(1–2):32–39, Jan.–Feb. **1949.** 2 figs., 12 refs., equations. **DLC**—A marked partial reflection of electromagnetic waves by atmospheric formations can only occur if the dielectric constant at the reflecting surface changes considerably in a distance shorter than or at the most of the same order as the wave length. Most reflections at inversions etc. are limited to waves of a few hundred meters or more. Decimeter waves can be reflected by water vapor discontinuities in transient turbulent eddies, mostly over the sea, and in thunderclouds and the space above them. Uniform ionization density in a thundercloud cannot explain reflection, and authors suggest local ionization in discharge channels. *Subject Heading:* **Radio meteorology.**—*C.E.P.B.*

11–176 551.594.6

Dattan, W., **Beitrag zur unnormalen Brechung ultrakurzer Wellen in der Atmosphäre.** [Contribution to abnormal refraction of ultra short waves in the atmosphere.] *Zeitschrift für Meteorologie*, 3(1–2):50–51, Jan.–Feb. **1949.** fig., ref. **DWB**—The 7.9 m. wave was received at a distance of 180 km., due to reflection from a relatively low layer in the atmosphere. *Subject Heading:* **Radio meteorology.**—*C.E.P.B.*

11–177 551.594.6

Doury, P., **Essai d'étude statistique des sources d'atmosphériques en Europe et sur l'Atlantique Nord.** [Attempt at a statistical study of sources of *sferics* in Europe and the North Atlantic.] *Journal Scientifique de la Météorologie*, 2(6):56–64, April–June **1950.** 12 figs., 2 refs. Summaries in French, English and Spanish p. 56. **MH-BH**—Using data obtained from radiogoniometer stations in the British Isles (1944–1948), the author has prepared 12 charts, showing for each month the average distribution of sources of atmospheric parasites from 30° to 70°N and from 40°E to 40°W long. On these charts, squares 5° (long) by $2\frac{1}{2}$° (lat.) are shaded according to six categories: <1, 1–4, 5–9, 10–19, 30–59 and >60 sources in each square. This shows the geographical distribution of *sferics* to be similar to that of thunderstorms (C.E.P. Brooks 1927) over the Atlantic and Europe. In summer practically no *sferics* originate over the Atlantic. In winter there are some maxima over the Bay of Biscay

(>15) and to the SW and W, but these do not compare with the maxima over the continent (>78) in the spring, summer and fall or over the Mediterranean (>30) in winter. Great similarity was shown between the charts drawn for the same month in each year (and in 1944–1950 as well) and a gradual transition occurred from month to month. *Subject Headings:* **Sferics, Statistical studies, Western Europe, North Atlantic Ocean.**—*M.R.*

11–178 551.594.7:621.396

Schenk, Karl, **Die Funkausbreitung als neues Hilfsmittel in der modernen Wetterforschung.** [Radio propagation as a new aid in modern weather observation.] *Deutscher Wetterdienst in der US-Zone, Berichte*, No. 12:215–218, **1950.** Discussion by H. Israël and Heinz Meinhold (with 3 figs.) p. 218–220. **MH-BH**—Argues that broadcast reception offers a means of investigating the relation between the ionosphere and weather and a possibility of constructing charts of levels in ionosphere. Proposes term "Funkmeteorologie" (Radio meteorology). *Subject Heading:* **Radio meteorology.**—*C.E.P.B.*

PART II. SELECTIVE ANNOTATED BIBLIOGRAPHY ON EVAPORATION

By: *Harris P. Kramer*

EXPLANATORY NOTE

The subject of evaporation is so broad and of such diverse application that it has been necessary to put definite limits on the scope of this bibliography. As much material as possible has been included for the last ten years; however, it was possible to include only a limited number of the more important works prior to 1940. Nothing at all has been entered for the period before 1910, since at that time a very complete and well-annotated bibliography on evaporation was published—(*see item* K–1).

The divisions of subject matter are evident in the Outline of Contents. Such a variety of terms have been used by various authors to specify the phenomena of energy exchange that some confusion naturally exists in trying to clarify the subject matter in outline form. It has been necessary in some instances to combine overlapping terms such as eddy diffusion and turbulent diffusion, heat exchange and heat balance, etc.

Future bibliographies will cover more thoroughly further aspects of turbulence, heat exchange and *grossaustausch*.

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EVAPORATION

1908–1919

K–1 551.573:016

†Livingston, Grace J., **An annotated bibliography of evaporation.** *Monthly Weather Review,* 36:181–186; 301–306, 375–381, June, Sept., Nov. **1908,** and 37:68–72; 103–109; 157–160; 193–199; 248–252, April, May, June 1909. **DWB**—(Reprint available.) **DLC**—An excellent coverage of work on evaporation chronologically arranged from 1670 to 1909. Author has attempted to give a sufficiently full summary of each reference so that the original need not be consulted except for full information. Articles on evaporation for meteorologists, agriculturists, and irrigation and hydraulic engineers included. Little is included on hygrometry. Also transpiration has not been specifically included. *Subject Headings:* **Evaporation, Bibliographies.**

K–2 551.573:551.521:551.579

Schmidt, Wilhelm, **Strahlung und Verdunstung an freien Wasserflächen; ein Beitrag zum Wärmehaushalt des Weltmeers und zum Wasserhaushalt der Erde.** [Radiation and evaporation f free water surfaces; a contribution to the study of the heat economy of the world's oceans and to he water economy of the earth.] *Annalen der Hydrographie und Maritimen Meteorologie*, 43:111–24, 1915. 2 tables, refs., equations. **DLC**—First calculation of evaporation from the oceans by neans of the energy equation. *Subject Headings:* **Evaporation, Sea Surfaces, Radiation, Hydrologic ycle.**

K–3 551.573(72)

*Duryea, Edwin, Jr., Haehl, H. L., and others, **A study of the depth of annual evaporation from ake Conchos, Mexico.** *American Society of Civil Engineers, Transactions*, 80:1829–2060, 1916. 1 figs., 7 plates, 99 tables, refs., equations. **DLC**—Paper treats of determination of yearly evapora- ion from a large reservoir, where an accurate value was needed, yet where there were no existing vaporation data for places nearer than 300 miles, and no local data except mean temperatures and levation above sea level. Estimates then checked by actual observations. Pan evaporation neasurements made, as well as temperature, effects of elevation, and determinations of inflow and utflow. *Subject Headings:* **Evaporation, Lake surfaces, Lake Conchos, Mexico.**

K–4 551.573:551.578.4

Baker, F. S., **Some field experiments on evaporation from snow surfaces.** *Monthly Weather Review*, 45:363–366, 1917. 2 figs., table, 3 refs., equation. **DWB**—Investigation of amount of vaporation from snow surfaces undertaken at Utah Experiment Station winter of 1915–1916. Iethod described. Diurnal and nocturnal evaporation determined separately. Wind and tem- erature conditions also recorded. Total evaporation for winter reckoned. Effect of forests con- idered. *Subject Heading:* **Evaporation of snow.**

K–5 551.573

†*Sleight, R. B., **Evaporation from the surface of water and river-bed materials.** *Journal of Agricultural Research*, 10(5):209–260, July 1917. 13 figs., 26 tables, 27 refs. **DLC**—Evaporation tudy conducted at the Irrigation Field Laboratory, Denver, Colo., divided into two major parts: hat from water surfaces and that from surfaces of river-bed materials. Procedures, data, analyses, tc., included. *Subject Headings:* **Evaporation, Land surfaces.**

K–6 551.573:551.508.7

Kadel, Benjamin C., **Instructions for the installation and operation of class "A" evaporation tations.** *U. S. Dept. of Agriculture, Weather Bureau, Circular L*, Instrument Division, Washington, 919. 30 p. 7 figs. **DLC**—Instructions given for installation, use, and care of instruments used or evaporation study. *Subject Heading:* **Evaporation instruments.**

1920–1929

K–7 551.573:551.521:551.513.1

Ångström, Anders K., **Applications of heat radiation measurements to the problems of the vaporation from lakes and the heat convection at their surfaces.** *Geografiska Annaler*, 3, 1920. 6 p. 5 tables, 14 refs., equations. **DWB**—Evaporation from Lake Vassijaure in summer deter- ined and theoretical values are applied to the problem of convection of heat from sea surfaces. ndicated that there must be a balance of energy between the insolation absorbed by a body of water nd the energy exchanges due to radiation, convection, conduction, and the latent heat of evapora- on, and that evaporation might be determined by measuring the components of this equilibrium. *ubject Headings:* **Evaporation, Lake surfaces, Heat exchange, Finland.**

K–8 551.573

†*Wüst, G., **Die Verdunstung auf dem Meere.** [Evaporation from the sea.] *Berlin, Uni- rsität, Institut für Meereskunde, Veröffentlichungen, A*, No. 6, 1920. 95 p. 11 figs., 33 tables, 50 fs., equations. **DLC**—Early series of observations of vapor pressure at different levels above the a recorded. Evaporation speed discussed in relation to other meteorological factors: air tem- erature, pressure, salt content, air movement, etc. *Subject Headings:* **Evaporation, Sea surfaces.**

K–9 551.573:551.511

Giblett, M. A., **Some problems connected with evaporation from large expanses of water.** *oyal Society of London, Proceedings, Ser. A*, 99:472–490, 1921. 7 figs., refs., 5 equations. **DLC**— uthor states that air passing over a water surface is generally turbulent, but in the immediate cinity of the surface is a thin superficial layer, which mixes only slowly with air above. Empirical

formula which expresses rate of evaporation per unit area in terms of temperature of water surface vapor pressure and speed of air near surface (where lapse rate of humidity first becomes small) is given. By this formula and mathematical analysis, resulting distribution of water vapor and rate of evaporation from large surfaces of water can be obtained. Some particular cases worked out. Also effects of wind speed, water surface temperature, and eddy diffusivity on evaporation from large water surface and on distribution of water vapor above it are examined. *Subject Headings:* **Evaporation, Turbulent diffusion, Sea surfaces.**

K–10 551.573:551.52

Carrier, Willis H. and Lindsay, Daniel C., **The temperature of evaporation of water into air—an experimental determination of the laws governing the deviation of the actual temperature of evaporation from the theoretical.** *American Society of Mechanical Engineers, Report*, given at annual meeting 1924. 43 p. 14 figs., 7 tables, refs., 27 equations. **DWB**—*Subject Headings:* **Evaporation, Temperature.**

K–11 551.573:551.551:551.513

Ångström, Anders K., **Evaporation and precipitation at various latitudes and the horizontal eddy convectivity of the atmosphere.** *Arkiv för Matematik, Astronomi och Fysik*, 19*A*, No. 20, 1925. 12 p. 3 tables, 6 refs., 3 equations. **DWB**—Circulation of water between equator and pole studied, including heat transport from low to high latitudes independent of temperature differences. Results applied to problem of heat economy at different latitudes. *Subject Headings:* **Evaporation, Convection, Energy exchange.**

K–12 551.573(431)

†*Fischer, Karl, **Niederschlag, Abfluss und Verdunstung des Weserquellgebiets.** [Precipitation, runoff and evaporation in the Weser source area.] *Jahrbuch für die Gewässerkunde Norddeutschlands Besondere Mitteilungen*, 4, No. 3, Berlin, 1925. 68 p. 5 plates, 72 tables, 45 refs. **DWB**—Translation by Max P. Schottenhamel and Earl R. Hewitt, AAF Library Translation No. 158. **DWB**—Exhaustive study including many observations, 1896–1915, and computations. Winter and summer relations established between precipitation, runoff and evaporation. Annual variation noted. *Subject Headings:* **Evaporation, Hydrologic cycle, Precipitation, Runoff, Weser River Basin, Germany.**

K–13 551.573:551.524.

Bowen, I. S., **The ratio of heat losses by conduction and by evaporation from any water surface.** *Physical Review*, 27:779–787, 1926. fig., 3 refs., 26 equations. **DLC**—It is shown that the process of evaporation and diffusion of water vapor from any water surface into the body of air above it is exactly similar to that of the conduction or "diffusion" of specific heat energy from the water surface into the same body of air. Formula represents the ratio of the heat loss by conduction to that by evaporation. *Subject Headings:* **Evaporation, Heat exchange.**

K–14 551.57

*Houk, Ivan E. and others, **Evaporation on United States Reclamation Projects.** *American Society of Civil Engineers, Transactions*, 90:266–378, 1927. 24 figs., 47 tables, refs., equations. **DLC**—Paper summarizes evaporation investigations of the Reclamation Bureau: mean monthly records with corresponding meteorological conditions, maximum and minimum values of monthly and annual evaporation at given stations; evaporation results from various types of pans and accompanying problems; measurements of ice evaporation at Saco, Montana. *Subject Headings:* **Evaporation, Evaporation of ice, Reclamation projects, Montana.**

K–15 551.573:551.571:551.51

Cummings, N. W., **Relation between evaporation and humidity as deduced quantitatively from rational equations based on thermodynamics and molecular theory.** *American Geophysical Union, Transactions*, 9:47–56, 1928. table, 12 equations. **DLC**—Theoretical investigation indicates that rate of change of evaporation with respect to humidity is a function of the ratio of sensible heat carried off by the wind to latent heat swept away by the vapor, of absolute humidity, water-temperature, air-temperature, and barometric pressure. *Subject Headings:* **Evaporat'on, Humidity, Thermodynamics.**

K–16 551.573(914)

*Selga, Miguel, **The evaporation at Manila.** Philippine Islands, Weather Bureau, 1928. 15 pp. figs., 10 tables, 13 refs. **DWB**—Characteristics of evaporation at Manila derived from the available observations. Instrument described. Data presented. Conclusions drawn. *Subject Headings:* **Evaporation, Manila, Philippines.**

K–17 551.573:551.513.1

Shuleĭkin, V., **The evaporation of seawater and the thermal intercourse between the sea and ıe atmosphere.** *Beiträge zur Geophysik*, 20:99–122, 1928. 12 figs., table, 5 refs., 4 equations. In nglish. **DLC**—Author concludes that evaporation velocity of water is in direct ratio to wind elocity and moisture deficit of air gliding over water surface. Amount of heat given off by water) air by way of radiation and convection is nearly in direct ratio to difference of temperatures of oth the media. Movement of air over water surface is not laminar but turbulent. At a given ind velocity and moisture, at some height above it, evaporation velocity from sea surface can be mputed if velocity of movement and moisture of air on the sea surface are known. Great number of bservations needed to make these computations. *Subject Headings:* **Evaporation, Heat exchange.**

K–18 551.573

Fischer, Karl, **Eine Methode den Schwankungen der Landesverdunstung näherzukommen.** [A method for estimating variations in land evaporation.] *Meteorologische Zeitschrift*, 46:241–245, 929. 2 tables, 4 refs., 23 equations. **DWB**—Equations developed for estimating evaporation from nd surfaces for yearly and half yearly periods, considering precipitation and runoff. *Subject leadings:* **Evaporation, Land surfaces.**

K–19 551.573:551.579.4

*Folse, J. A., **A new method of estimating stream-flow based upon a new evaporation formula.** *arnegie Institution of Washington, Publication*, No. 400, 1929. 235 p. 22 plates, 66 tables, refs., 00 equations. **DLC**—Thorough, detailed study of laws of evaporation and stream flow. Evapora- ion from Great Lakes studied by methods of statistical analysis, using Weather Bureau data. quation developed giving the evaporation from a large water surface in terms of the deficit in vapor ressure and the wind travel. *Subject Headings:* **Evaporation, Stream flow, Great Lakes.**

K–20 551.573

Himus, G. W., **The evaporation of water in open pans.** Presented at Conference on Vapour bsorption and Adsorption sponsored by Institute of Chemical Engineers, London, 1929. [7:166–77, 1929]. (Unchecked.)—Formula given for rate of evaporation taking into consideration vapor ressures at the surface of water and in the overlying air current, and wind velocity. *Subject Head- ıgs:* **Evaporation pans, Vapor pressure, Wind velocity.**

K–21 551.573:551.55

Szweikowski, N., **Einfluss des Windes auf die Verdunstung einer ebenen Fläche.** [Influence f wind on evaporation from a level surface.] *Beiträge zur Geophysik*, 24:293–308, 1929. 43 quations. **DLC**—Theoretical treatment of empirical formulas for evaporation in relation to wind peed. Methods of Cauchy-Briot, Schirbeck and Green, discussed. *Subject Headings:* **Evaporation, Vinds.**

1930–1935

K–22 551.573

Bossolasco, Mario, **Condensazione ed evaporazione.** [Condensation and evaporation.] *leteorologia Pratica*, 11:143–151, 1930. fig., 8 refs., 4 equations. **DWB**—Temperature and relative umidity considered from hygienic point of view. *Subject Headings:* **Evaporation, Condensation, Iedical meteorology.**

K–23 551.573(431)(83)

Knoche, Walter, **Eine Methode zur angenäherten Berechnung der Verdunstung.** [A method r approximate calculations of evaporation.] *Meteorologische Zeitschrift*, 47:14–16, 1930. 3 tables, refs., equation. **DWB**—Brief article with three small tables showing annual and daily evaporation Potsdam, Germany, and some monthly averages of evaporation for calm and windy conditions in fferent parts of Chile. *Subject Headings:* **Evaporation, Germany, Chile.**

K–24 551.573

McEwen, G. F., **Results of evaporation studies conducted by the Scripps Institution of Ocean- raphy and the California Institute of Technology.** *California, University, Scripps Institution of ceanography, Technical Ser.*, 2(11):401–415, 1930. 12 refs., 22 equations. **DLC**—Summary of vestigations of evaporation from large exposed bodies of water, involving observations on fresh ater lakes and on small containers under laboratory conditions, keeping evaporation from the sea mind. *Subject Headings:* **Evaporation, Lake surfaces.**

K–25 551.573:551.57

Parshall, Ralph L. and others, **Experiments to determine rate of evaporation from saturated soil and river-bed sands.** *American Society of Civil Engineers, Transactions*, 94:961–999, 1930. 14 figs., 10 tables, refs. **DLC**—Study made of evaporation loss from various types of soil contained in tanks under like exposure and with three different water table levels. Methods and procedure are described, and information submitted on relations between the various soils and conditions of evaporation. *Subject Headings:* **Evaporation, Soil moisture, Land surfaces.**

K–26 551.57

von dem Borne, Heinrich, **Verdunstungsstudien.** [Evaporation studies.] *Annalen der Hydrographie und Maritimen Meteorologie*, 58:409–427, **1930.** 22 figs., 4 tables, 25 refs., numerous equations. Remarks by M. Robitzsch, *Ibid.*, 59:152–155, 1931. **DLC**—Apparatus and measurement procedures described. Influence of wind, temperature and air pressure on evaporation considered. Radiation effects and measurement taken up and results from various apparatus compared. *Subject Heading:* **Evaporation.**

K–27 551.57

†Cherubim, R., **Über Verdunstungsmessung auf See.** [Measurement of evaporation from the sea.] *Annalen der Hydrographie und Maritimen Meteorologie*, 59:325–335, **1931.** 8 figs., tables, 4 refs., equations. **DLC**—Methods and measurements made at sea described and discussed. Relation between evaporation and meteorological elements noted. Estimate made, from table, of the total evaporation from the seas of the world. *Subject Headings:* **Evaporation, Sea surfaces.**

K–28 551.573:551.52

Richardson, Burt, **Evaporation as a function of insolation.** *American Society of Civil Engineers, Transactions*, 95:996–1019, **1931.** 14 tables, 30 refs., 26 equations. **DLC**—Paper considers effect of insolation and measurement of the quantity of radiant heat imparted by the sun and sky to the water and the bottom of a reservoir. *Subject Headings:* **Evaporation, Insolation.**

K–29 551.57

†*Rohwer, Carl, **Evaporation from free water surfaces.** *U. S. Dept. of Agriculture, Technical Bulletin* No. 271, **1931.** 96 p. 15 figs., 19 tables, 34 refs., 7 equations. **DLC**—Sections discuss evaporation formulas developed by previous investigators; still-air observations; effect of temperature on evaporation equipment; observations with controlled wind under laboratory conditions; outside observations; evaporation from ice under controlled conditions; effect of altitude on evaporation; influence of size of tank on evaporation at Fort Collins, Colo.; observations at Stonyford, Calif.; computation of evaporation from meteorological data. *Subject Headings:* **Evaporation, Evaporation of ice.**

K–30 551.57

Theis, C. V., **Some recent studies in evaporation.** *American Geophysical Union, Transactions*, 12:220–224, **1931.** 2 figs., 2 tables, equations. **DLC**—Brief reviews of several evaporation studies. In his own evaporation studies author attempts to combine the effects of solar radiation and deficit in vapor pressure, in working out methods of evaporation measurement. Some Weather Bureau records from Lincoln, Nebr., and from Yuma, Ariz. are utilized. *Subject Headings:* **Evaporation, Nebraska, Arizona.**

K–31 551.57

Wagner, A., **Zur Frage der Verdunstung.** [The problem of evaporation.] *Beiträge zur Geophysik*, 34:85–101, **1931.** 2 figs., refs., 14 equations. **DLC**—Evaporation formulas of different authors given and discussed. Importance of considering conditions of atmosphere, air density, wind speed, air pressure, etc. stressed. Amount of evaporation from a snow cover investigated. *Subject Headings:* **Evaporation, Evaporation of snow.**

K–32 551.57

*Banerji, S. K. and Wadia, H. M., **On evaporation and its measurement.** (First paper.) *India Meteorological Dept., Memoirs*, 25(9):291–325, **1932.** 18 figs., 3 plates, 12 tables, 16 refs., equations. **DLC**—Continuous records of evaporation in the open from pure water and sea water, obtained for several months, are given in Part I, along with method, instruments, procedures, and analyses of data. Diurnal variations and relationship of meteorological factors to evaporation noted. Part II describes indoor experiments, where wind speed and direction, temperature variations, tank dimensions, and coefficient of eddy diffusion, are considered. *Subject Heading:* **Evaporation.**

K–33 551.573

Grunsky, C. E., **Evaporation from lakes and reservoirs.** *Monthly Weather Review*, 60:2–6, 1932. 2 figs., table, 3 refs., equations. **DLC**—Author suggests a type of land pan to give results for a month which will indicate the relative amount of evaporation loss from widely separated large open water surfaces. Some conclusions given on relation of mean monthly temperature to mean monthly evaporation rate, including effect of air movement and altitude on this rate. *Subject Headings:* **Evaporation, Lakes and reservoirs.**

K–34 551.573:551.579(792)

*White, Walter N., **A method of estimating ground-water supplies based on discharge by plants and evaporation from soil; results of investigations in Escalante Valley, Utah.** *U. S. Geological Survey, Water-Supply Paper* 659-A, 1932. 105 p. 29 figs., 9 tables, 10 plates, 11 refs. **DWB**—Results yielded estimates of available ground water. *Subject Headings:* **Evaporation, Ground water, Escalante Valley, Utah.**

K–35 551.573:551.579

Bartels, J., **Verdunstung, Bodenfeuchtigkeit und Sickerwasser unter natürlichen Verhältnissen.** [Evaporation, soil moisture, and seepage under natural conditions.] *Zeitschrift für Forst- und Jagdwesen*, 65:204–219, 1933. 7 figs., 3 tables. **DA**—Study of water economy of plants and of the earth. Precipitation, runoff and evaporation data given and analyzed to compute water economy values. Variations by months and years noted. *Subject Headings:* **Evaporation, Hydrologic cycle, Soil moisture.**

K–36 551.573:551.524.4

Findeisen, Walter, **Beziehungen zwischen Reibung, Wärmeübergang und Verdunstung.** [Relations between friction, heat transfer and evaporation.] *Beiträge zur Geophysik*, 39:356–373, 1933. fig., 26 refs., 17 equations. **DLC**—Theoretical treatment and consideration of the existing relations between the processes of heat transfer, friction and evaporation on body surfaces, made on the basis of the boundary layer theory and related concepts. Differences between laminar and turbulent frictional layers pointed out. *Subject Headings:* **Evaporation, Heat exchange.**

K–37 551.573(764)

*Karper, R. E., **Rate of water evaporation in Texas.** *Texas Agricultural Experiment Station, Bulletin*, No. 484, Nov. 1933. 27 p. 2 figs., 22 tables. **DLC**—Daily evaporation and other meteorological observations, taken at points representative of the various agricultural regions of Texas, are recorded. *Subject Headings:* **Evaporation, Texas.**

K–38 551.573

Rohwer, Carl, **Evaporation from salt solutions and from oil-covered water surfaces.** *Journal of Agricultural Research*, 46:715–729, April 1933. 3 figs., 5 tables, 7 refs., equation. **DLC**—Experiments conducted at Fort Collins, Colo., to determine effect of salt in solution and of oil film over surface of water on evaporation, and the influence of meteorological factors under these conditions. Results reported. Both factors slow down evaporation to varying degrees. *Subject Heading:* **Evaporation.**

K–39 551.573

Schmid, Ekkehard, **Untersuchungen an Verdunstungsmessern.** [Investigations on evaporation measurement instruments.] *Meteorologische Zeitschrift*, 50:288–293, 1933. 5 figs., table, 11 refs., 2 equations. Comment on Schmid's work by Wilhelm Schmidt: [**A procedure for correctly measuring evaporation from a free water surface.**] *Ibid.*, p. 486–488, 1933. fig. **DWB**—Effects of heat energy exchange on the amount of evaporation, and of temperature distribution on evaporating surfaces are considered. *Subject Headings:* **Evaporation, Heat exchange, Evaporation instruments.**

K–40 551.573:551.586

von Boguslawski, E. and Mitscherlich, Eilh. Alfred, **Verdunstungsmessungen. Ein Beitrag betreffend den klimatischen Wachstumsfaktor Wasser.** [Evaporation measurement. A contribution concerning water as a climatic factor of growth.] *Annalen der Hydrographie und Maritimen Meteorologie*, 61:191–196, 1933. 5 tables, 2 refs. **DWB**—Role of water and evaporation with respect to growth of vegetation is considered; some data on rate of evaporation given. *Subject Headings:* **Evaporation, Bioclimatology.**

K–41 551.573(792)

Adams, Thomas C., **Evaporation from Great Salt Lake.** *American Meteorological Society, Bulletin*, 15:35–39, 1934. 2 tables. **DLC**—Report of experimental studies of evaporation from

Great Salt Lake, considering open surface of lake and effect of salt content. The more peculiar aspects of evaporation of this water are discussed. Small table gives total annual averages. *Subject Headings:* **Evaporation, Lakes, Great Salt Lake, Utah.**

K–42 551.573(988)(793)

*Church, J. E., **Evaporation at high altitudes and latitudes.** *American Geophysical Union, Transactions*, 15:326–342, **1934.** 14 tables. Appendix A. **Measurements of evaporation and temperature from soil and water in southern Greenland,** p. 343–351. **DWB**—Evaporation observations at high altitudes in connection with effects of mountains and forests upon the conservation of snow, made on slopes of Mount Rose and Lake Tahoe Basin, 1910–1917. Value of study lies in unusual conditions in which measurements were made and their application to study of evolution of snow and ice. Appendix gives insight into temperature conditions of soil and water, as well as theoretical and actual evaporation measurements in Greenland. *Subject Headings:* **Evaporation, Nevada, Greenland.**

K–43 551.573

†*Follansbee, Robert, **Evaporation from reservoir surfaces.** *American Society of Civil Engineers, Transactions*, 99:704–747, **1934.** 20 tables, 53 refs. **DLC**—Results of all available evaporation records of U. S. and foreign countries reduced to reservoir surface evaporation by means of special coefficients for each station. Results given in summarized form of 210 evaporation records, along with temperature, wind, and humidity records when available. Effects of temperature, wind and relative humidity, compared. Variations in evaporation throughout U. S. discussed. *Subject Headings:* **Evaporation, Lakes and reservoirs.**

K–44 551.573

*Horton, Robert E. and Cole, John S., **Compilation and summary of the evaporation records of Bureau of Plant Industry, U. S. Dept. of Agriculture, 1921–32.** *Monthly Weather Review*, 62:77–89, **1934.** 3 tables. **DLC**—Extensive tables show evaporation records. *Subject Headings:* **Evaporation, Observational data, Agricultural meteorology.**

K–45 551.573:551.551

Sutton, O. G., **Wind structure and evaporation in a turbulent atmosphere.** *Royal Society of London, Proceedings, Ser. A*, 146:701–722, **1934.** fig., refs., 21 equations. **DLC**—Theoretical article in which a theory of the transfer of momentum and mass in a turbulent medium is developed, elaborated, and extended to the problem of evaporation, on the assumption that the diffusion of mass follows the same laws as the diffusion of momentum. *Subject Headings:* **Evaporation, Turbulence, Wind structure.**

K–46 551.573:551.508.7:551.584

Dörffel, Katharina, **Die physikalische Arbeitsweise des Gallenkamp-Verdunstungsmessers und seine Anwendung auf mikroklimatische Fragen.** [The physical characteristics of the Gallenkamp evaporimeter and its application to microclimatic problems.] *Leipzig, Universität, Geophysikalisches Institut, Veröffentlichungen*, 2nd ser., 6:177–122, **1935.** 25 figs., 10 tables, 17 refs., 12 equations. **DWB**—Description of instrument and procedure given. Evaporation discussed as a problem of exchange, as well as effects of wind and radiation on evaporation. The part of evaporation in microclimatology is investigated. *Subject Headings:* **Evaporation, Microclimatology, Evaporimeters.**

K–47 551.573(43)

Friedrich, W., **Messungen der Verdunstung vom Erdboden.** [Measurement of evaporation from the soil.] *Kulturtechniker*, 38:234–251, **1935.** 3 figs., 3 tables, 4 refs., equation. **DA**—Observations at Eberswalde, Germany, presented. Records of different lysimeters and values for precipitation, evaporation, temperature, and humidity are given. *Subject Headings:* **Evaporation, Land surfaces, Germany.**

K–48 551.573

Roncali, Giorgio, **Sulle misure di evaporazione.** [Measurement of evaporation.] *Meteorologia Pratica*, 16:127–129, **1935.** **DWB**—Brief description of method—no data, illustrations, or theoretical development. *Subject Heading:* **Evaporation.**

K–49 551.573

Wegener, Kurt, **Die Frage der Verdunstung.** [The problem of evaporation.] *Meteorologische Zeitschrift*, 52:342–343, **1935.** fig. **DWB**—Very brief description of evaporation experiment, emphasizing diffusion speed, air pressure and humidity. *Subject Heading:* **Evaporation.**

1936–1939

K–50 551.573(494)

Burger, H., **Verdunstung.** [Evaporation.] *Zeitschrift für angewandte Meteorologie*, 53:218–222. **1936.** tables. **DWB**—Measurement of evaporation from forested and cultivated land. Some brief records from near Thun, Switzerland, are given. *Subject Headings:* **Evaporation, Switzerland.**

K–51 551.573

Conrad, V., **Die Evaporationskraft des Hochgebirges.** [Evaporative power in high mountains.] *Zeitschrift für angewandte Meteorologie*, 53:111–115, **1936.** 2 tables, 6 refs., equation. **DWB**—Lake levels at high altitudes examined. Also: **Verdunstungsgrösse und Seehöhe.** [Amount of evaporation and altitude of lake.] *Ibid.*, p. 310–312. fig., 2 tables, 4 refs. **DWB**—Brief further consideration of inflow, outflow and precipitation balance in lakes at high altitudes, based on records from Nevada. *Subject Heading:* **Evaporation.**

K–52 551.573:551.551

†*Dörffel, K. and Lettau, H., **Der Wasserdampfübergang von einer nassen Platte an strömende Luft.** [Water vapor transfer from a wet plate to an air stream.] *Annalen der Hydrographie und Maritimen Meteorologie*, 64:342–352, 504–510, **1936.** 9 figs., 10 tables, 21 refs., equations. **DLC**—A highly technical article on the measurement of evaporation and related problems of heat exchange. The necessity of including the *fetch* or length of air trajectory over the moist surface in calculations of evaporation and moisture transport, is brought out. Size of evaporation reservoir is, therefore, of prime importance in instrumentation. Applications to problems of micro- and bioclimatology, as well as to synoptic and marine observations and to energy exchange studies over the continents and oceans, considered. *Subject Headings:* **Evaporation, Energy exchange, Turbulent exchange.**—*M.R.*

K–53 551.573:551.511

Kennedy, R. E. and Kennedy, R. W., **Evaporation computed by the energy-equation.** *American Geophysical Union, Transactions*, 17:426–430, **1936.** 2 figs., 3 tables, 2 equations. **DLC**—Fundamental energy equation is given. Study of energy relations conducted to compute monthly evaporation from Devil's Lake, N. Dak., and to compare it with observed evaporation minus subsurface inflow. *Subject Headings:* **Evaporation, North Dakota.**

K–54 551.573

Lurie, M. and Michailoff, N., **Evaporation from free water surface.** *Industrial and Engineering Chemistry, Industrial Edition*, 28:345–349, **1936.** 10 figs., 13 refs., equations. **DLC**—Experimental study of evaporation from free water surface conducted under controlled conditions. Factors of humidity, temperature and wind speed analyzed. Equations developed. *Subject Heading:* **Evaporation.**

K–55 551.573

Maurer, J. and Peppler, W., **Verdunstung von freien Wasserflächen.** [Evaporation from free water surface.] *Zeitschrift für angewandte Meteorologie*, 53:313–323, **1936.** 5 tables, refs. **DWB**—Tables of evaporation from free water surfaces given for different lakes in different climate conditions. *Subject Headings:* **Evaporation, Lake surfaces.**

K–56 551.573(492)

Mazure, J. P., **De verdamping van het Ijsselmeer.** [Evaporation from Lake IJssel.] *Hemel en Dampkring*, 34:85–92 and 140–146, **1936.** (Unchecked.)—*Subject Headings:* **Evaporation, Lake surfaces, Netherlands.**

K–57 551.573:551.521

Mosby, Häkon, **Verdunstung und Strahlung auf dem Meere.** [Evaporation and radiation from the sea.] *Annalen der Hydrographie und Maritimen Meteorologie*, 64:281–286, **1936.** fig., table, refs., equations. **DLC**—In computations of the mean annual evaporation at various latitudes over the oceans, author assumes a constant, 0.10 for R, which is the ratio between the amount of heat given off to the atmosphere by convection and the amount of heat used for evaporation. *Subject Headings:* **Evaporation, Radiation, Heat exchange, Sea surfaces.**

K–58 551.573

Popov, V. P., **Isparenie i balans vlagi na poverkhnosti pochvy.** [Evaporation and moisture balance on the soil surface.] *Meteorologiia i Gidrologiia*, No. 12:40–52, **1936.** figs., 6 tables, refs.

DLC—Müller's and Erzbach's evaporation equations and author's observations are discussed. *Subject Headings:* **Evaporation, Soil moisture.**

K–59 551.573

Sverdrup, H. U., **Das maritime Verdunstungsproblem.** [The maritime evaporation problem.] *Annalen der Hydrographie und Maritimen Meteorologie*, 64:41–47, **1936.** 2 figs., table, refs., equation. **DLC**—Theoretical formula for evaporation can be worked out taking for granted that the sea has a semi-laminar border layer, and considering the wind speed and turbulence of the sea's surface. *Subject Headings:* **Evaporation, Turbulence, Sea surface.**

K–60 551.573:551.578.1

Takahasi, Yosihiko, **Experiments on the evaporation of waterdrops and some applications of their results to the investigations on raindrops.** *Geophysical Magazine, Tokyo*, 10:321–330, **1936.** 8 figs., 3 tables, 4 refs., 21 equations. In English. **DWB**—Results can be applied to evaporation of raindrops on the ground. Equation uses values of air temperature and relative humidity in relation to absolute humidity. *Subject Headings:* **Evaporation, Raindrops.**

K–61 551.573:551.577(26)

Wüst, Georg, **Oberflächensalzgehalt, Verdunstung, und Niederschlag auf dem Weltmeere nebst Bemerkungen zum Wasserhaushalt der Erde.** [Surface salt content, evaporation and precipitation of the oceans along with remarks on the water economy of the earth.] (In **Länderkundliche Forschung; Festschrift für Norbert Krebs,** Stuttgart, **1936.** p. 347–359. 4 figs., 4 tables, 29 refs., equations.) **DLC**—*Subject Headings:* **Evaporation, Hydrologic cycle, Precipitation, Sea surface.**

K–62 551.573(569.4)

Ashbel, D., **Evaporation in Palestine.** *Palestine Journal of Botany and Horticultural Science*, 1(3), **1937.** 21 p. 3 figs., 15 tables. (Reprint available.) **DWB**—Summary given of available data on evaporation measurements made at seven stations in 1935–1936 in various climatic regions of Palestine, made by means of Piché tube. Data analyzed according to season, region, time of day, wind direction and type of air mass. Importance of vegetation stressed. *Subject Headings:* **Evaporation, Palestine.**

K–63 551.573

Burger, Hans, **Boden, Vegetation und Verdunstung.** [Soil, vegetation and evaporation.] *Beiträge zur Geophysik*, 50:137–142, **1937.** **DLC**—General discussion of evaporation, the importance of considering meteorological factors, effects of vegetation, precipitation measurements, etc. No theoretical development or observational data of importance. *Subject Heading:* **Evaporation.**

K–64 551.573

du Chaxel, R., **Quelques données expérimentales concernant l'influence de certains facteurs météorologiques sur l'évaporation de l'eau contenue dans le sol.** [Experimental data on the influence of certain meteorological factors on evaporation of water from soil.] *La Météorologie*, p. 25–33, **1937.** 4 figs., 2 tables, 2 refs., 2 equations. **DWB**—Evaporation considered in relation to temperature and mean relative humidity and as a function of temperature gradient. *Subject Headings:* **Evaporation, Land surfaces.**

K–65 551.573

†Fischer, Karl and Friedrich, Wilhelm, **Zur Beurteilung der Verdunstungsmessungen an freien Wasserflächen.** [Evaluation of evaporation measurement on free water surface.] *Beiträge zur Geophysik*, 50:285–298, **1937.** 4 figs., refs., table. **DLC**—Work of several writers on evaporation measurement discussed and evaluated. *Subject Heading:* **Evaporation.**

K–66 551.573:551.586.5

Leighly, John, **A note on evaporation.** *Ecology*, 18:180–198, **1937.** 5 figs., 13 refs., 5 equations. **DLC**—Critical examination of the relation of evaporation to ecological problems. Theory of rate of evaporation is elaborated, based on hypothesis of the existence of a laminar boundary layer of air, having a thickness which varies with the wind velocity at the evaporating surface. Theory developed is used as the basis for a definition of "relative transpiration." *Subject Headings:* **Evaporation, Ecology, Evapotranspiration.**

K–67 551.573:551.551

Lettau, Heinz, **O. G. Suttons Theorie der Verdunstung in turbulenter Luft im Vergleich zu neueren Beobachtungen.** [O. G. Sutton's theory of evaporation in turbulent air in comparison with

nore recent observations.] *Annalen der Hydrographie und Maritimen Meteorologie*, 65:155–160, **937.** table, 8 refs., equation. **DLC**—Review and critical comment on Sutton's theory of evapora- ion. *Subject Headings:* **Evaporation, Turbulence.**

K–68 551.573:551.554:551.513.1

Lettau, Heinz, **Weiterführung der Freiballon-Untersuchungen über effektiven Vertikalaus- ausch und Luftmassen-Alterung mit Anwendung auf die Frage der Land-Verdunstung.** [Further evelopment of free-balloon investigation on effective vertical exchange and air mass changes with pplication to the question of land evaporation.] *Meteorologische Zeitschrift*, 54:406–412, **1937.** figs., 5 tables, 7 refs. **DWB**—*Austausch* theories for various conditions worked out, using dust articles and balloons. From the increase of water content in the atmosphere the average land vaporation is indicated and specific humidity and effective *austausch* estimated. *Subject Headings:* **Evaporation, Vertical motion, Energy exchange.**

K–69 551.573

Meyer, Adolph F. and Levens, A. S., **Determining evaporation losses from Weather Bureau ata.** *Engineering News-Record*, 118:481–483, April **1937.** 2 figs., table, equations. **DLC**— Restudy of evaporation formula confirms its practical value and defines a new coefficient applicable o the computation of water losses from large lakes. Evaporation data from Davis, Calif., July 910, utilized. *Subject Heading:* **Evaporation.**

K–70 551.573

Meyer, Aug. F., **Verdunstungsmessungen.** [Evaporation measurements.] *Wasserkraft und Vasserwirtschaft*, 32:52–56, 64–69, 77–81, **1937.** 7 figs., 11 tables, 16 refs. **DLC**—Evaporation in he equation of water economy considered; as well as evaporation forces, soil evaporation, measure- ient methods at different places and under different conditions, etc. *Subject Heading:* **Evaporation.**

K–71 551.573:551.554:551.571.4

Millar, F. Graham, **Evaporation from free water surfaces.** *Canada, Meteorological Service, Memoirs*, 1(2):43–65, **1937.** 9 figs., 6 tables, 16 refs., 9 equations. **DLC**—Discussion of wind tunnel vaporation experiments from empirical point of view. Theory of turbulent mass exchange used to evelop equations for evaporation from both finite and infinite free water surfaces. Formulas ob- ained are in agreement with principle of dynamic similarity and are claimed to be of more general pplication than the usual power laws, and are verified by the observational material for a wide ange in the size of surface. In order to obtain good agreement between theory and experiment sing treatment of eddy transfer developed by Sverdrup, it was necessary to adjust the value of a onstant in von Kármán's expression for skin friction. *Subject Headings:* **Evaporation, Turbulent xchange.**

K–72 551.573

Namekawa, Tadao and Takahasi, Tatutosi, **Note on the rate of evaporation of small water-drops, uch as rain drops.** *Kyoto Imperial University, College of Science, Memoirs, Ser. A*, 20:139–146, **1937.** figs., 5 tables, 8 refs., 8 equations. (Reprint.) **DWB**—Short study of evaporation of water drop ith radius under 1 mm. Theoretical conclusion formulated considering Maxwell's theory of wet- ulb thermometer for still-air evaporation, and boundary layer hypothesis for moving air. *Subject eadings:* **Evaporation, Raindrops.**

K–73 551.573:551.586.5

Parshall, R. L., **Laboratory measurement of evapo-transpiration losses.** *Journal of Forestry*, 5:1033–1040, **1937.** 5 tables. **DLC**—Evapotranspiration losses of several common plants in- estigated by growing plants in soil tanks with shallow depths of soil and high water tables. Results btained were reasonably consistent, but not numerous enough to establish definite conclusions. *ubject Heading:* **Evapotranspiration.**

K–74 551.573:551.571.4

Sverdrup, H. U., **On the evaporation from the oceans.** *Journal of Marine Research*, 1:3–14, **937.** 4 figs., 3 tables, 6 refs., 14 equations. **DLC**—Previous computations of evaporation revised om which evaporation from the ocean can be computed. Equation expresses the rate of evapora- on as a function of the difference in vapor pressure between sea surface and atmosphere, and of the ind movement within the turbulent layer. Instead of introducing a roughness parameter which ncreases with increasing wind velocity, one must introduce a constant value, or consider the sea rface as being smooth. Thickness of boundary layer through which vapor transport takes place y diffusion studied along with the mechanism of the transport of water vapor. *Subject Headings:* **vaporation, Sea surfaces, Turbulent exchange, Oceans.**

K–75 551.573

†U. S. Special Advisory Committee on Hydrologic Data, **Proposals for projects in hydrologic research. Section V. Evaporation** [1937]. 24 p. refs. (Mimeographed.) **DWB**—Items include: correlation of records and relations of pans and open water; development and improvement o equipment; study of effects of meteorological and other factors on evaporation; studies of evapo transpiration losses; insolation as a measure of open water evaporation; measurement of evaporation from surface of snow and ice; features affecting rates of evaporation from water surfaces (waves water depth, humidity gradients, etc.); relationship of wind velocity, temperature and humidity a high elevations to evaporation. *Subject Headings:* **Evaporation, Evapotranspiration, Evaporation instruments, Evaporation of snow.**

K–76 551.573:551.524:551.541(261

Wüst, Georg, **Temperatur- und Dampfdruckgefälle in den untersten Metern über der Meeresoberfläche.** [Temperature and vapor pressure gradients in the lowest meters above the sea surface.] *Meteorologische Zeitschrift*, 54:4–9, Jan. **1937.** 5 figs., 5 tables, 9 refs. **DWB**—Autho makes detailed analysis of his data of 1920 on vapor pressure at different levels above the sea. State that logarithmic law is not valid below a level of about 50 cm. Average values of the evaporation for regions of the Atlantic Ocean compiled, along with average wind velocities from these regions. *Subject Headings:* **Evaporation, Temperature, Vapor pressure, Atlantic Ocean.**

K–77 551.573:551.579.

du Chaxel R., **Sur une méthode d'étude de la répartition verticale de l'eau contenue dans le sol et de ses variations périodiques.** [A method for the study of vertical distribution of soil moistur and its periodic variations.] *La Météorologie*, p. 110–114, **1938.** 2 figs., table, refs. **DWB**— Moisture content of soil and causes for its variations considered, including some discussion of evap oration. *Subject Headings:* **Evaporation, Soil moisture.**

K–78 551.57

Friedrich, Wilhelm, **Zur Methode der Verdunstungsmessungen.** [A method for evaporation measurements.] *VI Baltische Hydrologische Konferenz, Berlin, Bericht 16C.* **1938.** 22 p. 6 figs. 3 tables, 16 refs., equation. **DWB**—Evaporation by regions, annual variations, short period determinations, etc., considered. *Subject Heading:* **Evaporation.**

K–79 551.573:551.51

Frigyes, Dési, **A hâtarretég elméletének alkalmazása a Gallenkampféle párolgásmérőre** [The boundary layer theory and its application to the Gallenkamp evaporation measuremen method.] *Időjárás*, 42:198–202, **1938.** fig., equations. German abstract p. 229. **MH-BH**— Method described. Equations given for evaporation determinations. *Subject Headings:* **Evapora tion, Boundary layer theory.**

K–80 551.573:551.578.

†Frössling, Nils, **Über die Verdunstung fallender Tropfen.** [On the evaporation of falling drops. *Beiträge zur Geophysik*, 52:170–216, **1938.** 9 figs., tables, 48 refs., 33 equations. Englis abstract. **DLC**—Theoretical and experimental investigation of the evaporation of a falling dro made, using liquids: nitrobenzene, aniline, and water. Method given and equation formulated *Subject Headings:* **Evaporation, Raindrops.**

K–81 551.57

Homann, F., **Die Verdunstung von Wasser aus ebenen und zylindrischen Oberflächen** [Evaporation of water from level and cylindrical surfaces.] *Forschung auf dem Gebiete des Ingenieurwesens*, 9:51–53, **1938.** 2 figs., 11 refs., equation. **DLC**—Factors influencing evaporation are briefly enumerated and discussed, particularly wind speed. *Subject Headings:* **Evaporation Winds.**

K–82 551.573:551.577.2(776

Jensen, J. C., **Evaporation and rainfall studies in the Northwest Minnesota Lake Region.** *American Philosophical Society, Proceedings*, 78:651–670, **1938.** 3 figs., 4 tables. **DLC**—Continuation of 1935 evaporation and rainfall studies. Tables show wide variations in thunderstorm rainfa at stations only a few miles apart. Further information obtained on rate of evaporation by observation of several lakes. Heat absorption from evaporation found more than the total incident solar radiation on corresponding surface, thus presence of lake is found to have decided cooling effect in addition to adding to the moisture content of the atmosphere. *Subject Headings:* **Evaporation Thunderstorm rainfall, Minnesota.**

K–83 551.573(47)

Koshanov, R. IA., **Isparenie rastitel'nost'iu i svobodnoĭ poverkhnost'iu torfianoĭ pochvy.** [Evaporation through vegetation and open surface of turf ground.] *Meteorologiia i Gidrologiia*, No. 6:113–122, **1938.** 3 figs., 2 tables, 10 refs. **DLC**—Evaporation observations for northern part of Belorussia in 1933–1934 are given. *Subject Headings:* **Evapotranspiration, U.S.S.R.**

K–84 551.573:551.551

†Quilez, J. D., **Turbulencia atmosférica y evaporación.** [Atmospheric turbulence and evaporation.] *Spain, Servicio Meteorológico, Ser. A*, No. 9, **1938.** 39 p. 30 refs., 56 equations. **DWB**—Formulas for calculations of evaporation and of turbulence discussed, and turbulence factor included in a final formula for calculating daily evaporation. *Subject Headings:* **Evaporation, Turbulence.**

K–85 551.573:551.511

Sharpley, B. F. and Boelter, L. M. K., **Evaporation of water into quiet air from a one-foot diameter surface.** *Industrial and Engineering Chemistry, Industrial Edition*, 30:1125–1131, Oct. **1938.** 10 figs., table, 11 refs., 5 equations. **DLC**—Results given of experimental studies of evaporation from pan of distilled water into quiet air, made prior to 1938 at University of California. Equations formulated for unit evaporation rates above and below critical regions (corresponding to a water temperature of 69.4°F.) A tentative correlation with thermal free convection data has been accomplished. *Subject Headings:* **Evaporation, Evaporation pans, Thermodynamics.**

K–86 551.573:551.586.5

Veihmeyer, F. J., **Evaporation from soils and transpiration.** *American Geophysical Union, Transactions*, 19:612–619, **1938.** 6 figs., 4 tables, 10 refs. **DLC**—Water relations of soils and plants studied; amount of water transpired by plants greater than that evaporated directly from soil surface. *Subject Headings:* **Evaporation, Evapotranspiration.**

K–87 551.573:551.579

Yamamoto, G. and Ogiwara, S., **Some experiments on the evaporation of water from soil, I.** *Meteorological Society of Japan, Journal*, 2nd Ser., 16:97–107, **1938.** 10 figs., tables, ref. In Japanese. **DWB**—Experimental investigation on relations between rate of evaporation from several soils and amount of water held in soils. Conclusions drawn depending on size of soil particles. *Subject Headings:* **Evaporation, Soil moisture.**

K–88 551.573:551.571(44)

Coutagne, Aimé, **Contribution à l'étude de l'humidité de l'air et de l'évaporation en montagne.** [Contribution to the study of humidity of air and of evaporation in the mountains.] (In **Nivomètre Mougin à Lecture Annuelle, 1939.** p. 19–34. figs., 5 tables, 3 equations.) **DWB.**

Also: **Le pouvoir évaporant de l'atmosphère dans la région Lyonnaise; recherche d'une formule traduisant sa variation saisonnière.** [The evaporating power of the atmosphere in the Lyon region; investigation of a formula expressing its seasonal variation.] *Ibid.* p. 35–42. table, equations. **DWB**—*Subject Headings:* **Evaporation, Humidity, Lyons, France.**

K–89 551.573:551.577(789)

*Hardy, Erle L., **Precipitation and evaporation in New Mexico.** *New Mexico College of Agriculture and Mechanic Arts, Agricultural Experiment Station, Bulletin*, 269, Dec. **1939.** 68 p. numerous graphs and tables. **DWB**—Precipitation records for 1938 given. Evaporation for different years from free water surfaces tabulated for various New Mexico stations on p. 45–49. Other precipitation data given. *Subject Headings:* **Evaporation, Precipitation, New Mexico.**

K–90 551.573:551.578.46

*Kaitera, Pentti, **The evaporation from snow.** *International Union of Geodesy and Geophysics, Association Internationale d'Hydrologie Scientifique, Comptes Rendus des Séances, Réunion de Washington*, **1939.** II, *Commission des Neiges, Question 2, Rapport 2.* 10 p. 3 figs., 6 tables, 3 refs. **DWB**—Evaporation measurements made in Helsinki at the Ilmala Observatory in 1937 and 1938. *Subject Headings:* **Evaporation of snow, Helsinki, Finland.**

K–91 551.573

Lloyd, David, **Evaporation over catchment areas.** *Royal Meteorological Society, Quarterly Journal*, 64:423–444, 1938. 7 figs., 3 tables, 2 refs., equations. Discussion. **DLC**—Variation in annual total loss over eight British drainage areas examined by statistical method. Provisional empirical formula derived by which probable loss by evaporation over catchment areas could be

estimated. Also, Part II. *Ibid.*, 65:385–396, 1939. 3 tables, 15 refs., equation. **DWB**—Formul applied to data of values of general rainfall, loss and weather details for drainage areas of norther Italy. *Subject Headings:* **Evaporation, Great Britain, Italy.**

K–92 551.57

†Thornthwaite, C. W. and Holzman, Benjamin, **The determination of evaporation from land an water surfaces.** *Monthly Weather Review*, 67:4–11, 1939. 7 figs., table, 39 refs., equations. **DLC**— In this preliminary report a method is presented for determining the evaporation from either lan or water areas in an effort to supply information on the actual moisture from all types of geographi surfaces—a quantitative estimate of the evaporative phase of the hydrologic cycle. *Subject Hea ings:* **Evaporation, Turbulence, Hydrologic cycle.**

K–93 551.573:551.57

Thornthwaite, C. W. and Holzman, Benjamin, **The role of evaporation in the hydrologic cycle** *American Geophysical Union, Transactions*, 20:680–686, 1939. 4 figs., 2 refs., 2 equations. **DLC**— From observations made at Arlington Experimental Farm, 1938, figures are drawn illustratin moisture concentration at two levels for different seasons and different atmospheric condition Importance of evaporation data in solution of problems of hydrologic cycle emphasized. *Subje Headings:* **Evaporation, Hydrologic cycle.**

K–94 551.573:551.508

Wilson, J. D., **Evaporation studies III. Ten years of evaporation at Wooster as measure with black and white atmometers.** *Ohio Agricultural Experiment Station, Bimonthly Bulletin* 24:11–25, 1939. 16 tables, 17 refs. **DA**—These atmometers made possible the measurement of th effect of sunshine (radiant energy) on evaporation as separate from the influence of other factor Data relative to temperature, wind velocity, rainfall, open pan evaporation and sunshine also re corded. Values for evaporation rates, effect of radiant energy, etc., computed. *Subject Heading* **Evaporation, Evaporimeters, Ohio.**

K–95 551.573:551.524:551.57

Wundt, Walter, **Die Verdunstung von den Landflächen der Erde in Zusammenhang mit de Temperatur und dem Niederschlag.** [Evaporation from the land surface of the earth in relation t temperature and precipitation.] *Zeitschrift für angewandte Meteorologie*, 56:1–9, 1939. table, refs. **DWB**—Generalized treatment in which author states evaporation to be determined by th difference between precipitation and runoff. Little data. Temperature also considered. *Subje Headings:* **Hydrologic cycle, Evaporation, Land surfaces, Precipitation, Temperature.**

1940–1944

K–96 551.573(79

Cummings, N. W., **The evaporation-energy equations and their practical application.** *America Geophysical Union, Transactions*, 21:512–522, 1940. 5 figs., 5 tables, 7 refs., 5 equations. **DLC**— Average daily evaporation from Bear Lake, Idaho, obtained by the aid of reliably developed energ equations. Equations render wind velocity measurements unnecessary and reduce evaporatio estimate error from humidity measurement errors. Equations and lake and pan losses discussed *Subject Headings:* **Evaporation, Bear Lake, Idaho.**

K–97 551.573:551.578.1:551.586

*Davis, Floyd E. and Pallesen, J. E., **Effect of the amount and distribution of rainfall and evap oration during the growing season on yields of corn and spring wheat.** *Journal of Agricultura Research*, 60(1):1–24, Jan. 1940. 3 figs., 20 tables, 8 refs., 6 equations. **DA**—Study made to a certain the influence on crop yield of certain weather factors at different stages during the season an to determine the critical period of the growing season. Equation presented for estimating yield, th rainfall during the season being known. Included along with rainfall data and analysis are annc tated tables containing evaporation distribution coefficients. *Subject Headings:* **Evaporation, Rain fall, Agricultural meteorology.**

K–98 551.573:551.508.7

Gordon, Hayden S., **Thermocouple psychrometers and evaporation studies.** *American Meteorc logical Society, Bulletin*, 21:115–116, 1940. 3 refs., equations. **DWB**—Instrument describec Equations given generally representing data of University of California investigation. (*See ite* K–85.) *Subject Headings:* **Evaporation instruments, Psychrometers.**

K–99 551.573:551.571.4

Montgomery, R. B., **Observations of vertical humidity distribution above the ocean surface and heir relation to evaporation.** Papers in Physical Oceanography and Meteorology, Massachusetts nstitute of Technology and Woods Hole Oceanographic Institution, 7, No. 4, **1940.** 30 p. 8 figs., 0 tables, 26 refs., 40 equations. **DLC**—Observations of humidity distribution, one to 38 meters bove the sea, are tabulated in detail. Humidity gradients found to depend markedly on hydro- ynamic character of the sea surface and on spray, which in turn depend on wind speed and thermal ability. Effect of the hydrodynamic character of the surface is summarized graphically giving a etailed example of the theoretical distributions of eddy viscosity, eddy diffusivity, wind and vapor ressure for both smooth and rough surfaces neglecting spray. Equation for rate of evaporation iven and discussed. *Subject Headings:* **Evaporation, Humidity distribution, Sea surfaces.**

K–100 551.573:551.579

Penman, H. L., **Meteorological and soil factors affecting evaporation from fallow soil.** *Royal Meteorological Society, Quarterly Journal*, 66:401–410, Oct. **1940.** 2 figs., table, 6 refs., equation. **DWB**—Evaporation measurements from fallow soil at Rothamstead for 94 periods of 13 to 45 days re treated. Shown that almost complete description of evaporation can be obtained in terms of ainfall only, the correlation varying with season. Physical treatment attempted, considering vaporation as due to diffusion across a nonturbulent boundary layer whose thickness is determined y wind velocity. *Subject Headings:* **Evaporation, England.**

K–101 551.573:551.579

Pettis, C. R. and Hickman, Harold C., **Hydrology of the Great Lakes. A symposium.** *American Society of Civil Engineers, Transactions*, 105:794–849, **1940.** 12 figs., 9 tables, 37 refs., 5 equations. **DLC**—1) **Typical quantitative analysis as applied to Lake Superior,** by Pettis. By means of eductions made from available data values are obtained for evaporation from the lake surface. nderground flow to lake and land losses are then computed.

2) **Evaporation experiments,** by Hickman. Extensive experiments conducted in pans at points n Great Lakes' shores. Readings analyzed and plotted on two charts from which estimate of ionthly or daily evaporation from Great Lakes can be made. *Subject Headings:* **Evaporation, Lake urfaces, Hydrology, Great Lakes.**

K–102 551.573:551.55

Siomi, K. and Yosida, S., [**Effects produced by wind on evaporation.**] *Meteorological Society Japan, Journal*, 18:206–210, **1940.** 2 figs., table. In Japanese. English abstract p. 23. **DWB**—ffects of wind velocity on evaporation speed examined in wind tunnel. Trabert's evaporation ormula used. Theoretical development. *Subject Headings:* **Evaporation, Winds.**

K–103 551.573

Sverdrup, H. U., **On the annual and diurnal variation of the evaporation from the oceans.** *ournal of Marine Research*, 3:93–104, **1940.** 4 figs., 13 refs., equations. **DLC**—Annual variation f evaporation examined by means of the energy equation for area off Bay of Biscay and for part of he Kuroshio off southern Japan. Maximum evaporation occurs in late fall or early winter in both; vaporation in Kuroshio nearly three times that off Bay of Biscay. *Subject Headings:* **Evaporation, ea surfaces, Kuroshio, Bay of Biscay.**

K–104 551.573:551.571:551.586.5

Thornthwaite, Charles W., **Atmospheric moisture in relation to ecological problems.** *Ecology*, 1:17–28, **1940.** 3 figs., 21 refs., equation. **DLC**—Importance of the relation of atmospheric oisture and evaporation to ecological problems is stressed. *Subject Headings:* **Evaporation, cology.**

K–105 551.573

Thornthwaite, C. W. and Holzman, Benjamin, **A year of evaporation from a natural land-urface.** *American Geophysical Union, Transactions*, 21:510–511, **1940.** 2 tables, 3 refs. **DLC**—bservations of precipitation, evaporation, and condensation at Arlington Experimental Farm, Va., re briefly summarized by months for 1939 in table. Other table shows losses of moisture into ontinental and maritime air masses during June and July 1939. *Subject Heading:* **Evaporation.**

K–106 551.573

Tomczak, Gerhard, **Verdunstung freier Wasserflächen.** [Evaporation of free water surfaces.] *Meteorologische Zeitschrift*, 57(8):284–290, Aug. 1940. 4 figs., 3 tables, 8 refs. **DWB**—Evaporation easurements made on inland lake. Additional evaporation formulas are derived so that it is

possible to measure the evaporation amounts by means of the usual evaporation gage at any heig above water and to reduce these values to the level of the water surface. *Subject Headings:* **Eva oration, Lake surfaces.**

K–107 551.573(98

*Church, J. E., **Climate and evaporation in Alpine and Arctic zones.** *University of Michiga Greenland Expeditions, Report*, Part 2, p. 7–59, **1941.** 6 figs., 31 tables, refs. **DLC**—Observation data on climate and evaporation from Lake Tahoe Basin and from southwestern Greenland are giv and discussed. Evaporation at Tahoe includes consideration of relative evaporation of snow a ice and water, evaporation from Marlette Lake (altitude 8,000 ft.) and Mount Rose (9,000 to 10,8 ft.) Atmospheric pressure, condensation and melting considered in relation to evaporation. In t Greenland observations major factors affecting evaporation are taken up; day and night and lo period measurements made; and effects of Föhn winds noted. *Subject Headings:* **Evaporatio Greenland, Tahoe Basin, California, Nevada.**

K–108 551.573:551.5

Holzman, Benjamin, **The heat-balance method of the determination of evaporation from wate surface.** *American Geophysical Union, Transactions*, 22:655–659, **1941.** 13 refs., 7 equatio **DLC**—Theoretical and practical criticism given of heat balance method for determining evaporati from water bodies because of difficulties in accurately measuring the essential parameters. A dire determination of evaporation by using humidity and wind gradient measurements in the turbule atmosphere is suggested. *Subject Headings:* **Evaporation, Heat balance.**

K–109 551.573:551.5

Lee, Charles H., **Total evaporation for Sierra Nevada watersheds by the method of precipitati and runoff differences.** *American Geophysical Union, Transactions*, 22:50–71, **1941.** 7 figs., tables, 5 refs., equation. Discussion. **DLC**—Author concludes in general that total evaporati from mountain watersheds can be computed if a tropographic map of the watershed, sufficie precipitation records to construct a precipitation elevation diagram, and runoff measurements for series of years, are available. Details developed and illustrated. *Subject Headings:* **Evaporatio Hydrology, Sierra Nevada.**

K–110 551.508.

Thornthwaite, C. W., **The chemical absorption hygrometer as a meteorological instrume** *American Geophysical Union, Transactions*, 22:429–432, **1941.** 6 refs. **DLC**—Methods of measuri atmospheric humidity are examined for use in evaporation studies, particularly the chemical absor tion hygrometer. *Subject Headings:* **Evaporation, Hygrometers.**

K–111 551.573(789)(76

Blaney, Harry F. and Morin, Karl V., **Evaporation and consumptive use of water empiric formulas.** *American Geophysical Union, Transactions*, 23:76–83, **1942.** fig., 3 tables, 16 ref 5 equations. **DLC**—Study made of consumptive use of water in valley areas of Pecos River, Nc Mexico and Texas. Method involved setting up annual values for evaporation and consumptive u of water for various types of vegetation. Relations investigated of evaporation to evapotranspir tion and to humidity and temperature with view of developing empirical formulas for estimati unit annual values of current and normal evaporation and consumptive use of water in areas whe temperature and humidity records are available. *Subject Headings:* **Evaporation, New Mexic Texas.**

K–112 551.5

†Harding, Sidney T., **Evaporation from free water surfaces.** (In **Physics of the Earth–I Hydrology.** Ed., Oscar E. Meinzer. **1942.** p. 56–82. 6 figs., 3 tables, 38 refs., equations **DLC**—General discussion of evaporation from free water surfaces, primarily from water surfac that are fully exposed to all local climatic factors. Many other works on subject are mentioned a quoted. *Subject Heading:* **Evaporation.**

K–113 551.573:551.5

Hursh, C. R., Hoover, M.D., and Fletcher, P. W., **Studies in the balanced water-economy experimental drainage-areas.** *American Geophysical Union, Transactions*, 23:509–516, **1942.** figs., 2 tables, 8 refs. **DLC**—Discusses problem of keeping accounts of essential water cycle facto for experimental drainage areas. Evaporation considered as one of many factors to be considered hydrologic cycle studies. *Subject Headings:* **Hydrologic cycle, Evaporation.**

K–114 551.573:551.586

†Lee, Charles H., **Transpiration and total evaporation.** (In **Physics of the Earth-IX; Hydrology.** d., Oscar E. Meinzer, **1942.** p. 259–330. 9 figs., 8 tables, 84 refs., equation.) **DLC**—Importance f considering plant life characteristics and processes in discussion of total evaporation is emphasized. wo general methods of measuring total evaporation are given: 1) the so-called rational method by ntegration of transpiration, soil evaporation, and interception for the area; 2) the method based on ifference between precipitation and runoff. Latter considered more practical. *Subject Headings:* **vaporation, Evapotranspiration, Ecology, Agricultural meteorology.**

K–115 551.573:551.579(41)

Lloyd, David, **Evaporation-loss per month from two drainage areas. I.** *Royal Meteorological ociety, Quarterly Journal,* 66:181–193, **1940.** 2 figs., 4 tables, 10 refs., equations. **DWB**—Monthly ata of the apparent loss by evaporation, etc., of moisture from Vyrnwy and Rivington drainage reas are examined in relation to rainfall and temperature.

Evaporation-loss per month over drainage areas: II. Loss over three areas. *Ibid.,* 67:33–38, **941.** 4 figs., 3 tables, 3 refs., equations. **DLC**—Data from three large British drainage areas xamined as above. Variations in loss by evaporation shown in relation to variations in rainfall and emperature.

III. Curvilinearity in relationship to rainfall of the same month and influence of previous rain-all. *Ibid.,* 68:35–43, **1942.** 5 figs., 7 refs., equations. Inferred statistically that rain of three revious months augments runoff and influences the value of apparent loss to a small extent, but not fficiently to alter the relation of evaporation loss produced in parts I and II. *Subject Headings:* **vaporation, Precipitation, Great Britain.**

K–116 551.573

*Meyer, Adolph, F., **Evaporation from lakes and reservoirs; a study based on fifty years' Weather ureau records.** Minnesota Resources Commission, **1942.** 111 p. 9 figs., 35 maps, graphs, 4 ables. **DLC**—Monthly and annual evaporation from lakes and reservoirs in the U. S., as determined y this study, are presented in the form of maps, graphs and tables, for use in design, construction, peration and maintenance of works using water; for use in agriculture and forestry; and for use in rther meteorologic and hydrologic studies. Appendix includes graphs of hydrological elements at 58 stations; maps of mean vapor pressure for each month, Jan. to Dec., and of mean evaporation or each month. *Subject Headings:* **Evaporation, Lakes and reservoirs, Vapor pressure, United tates.**

K–117 551.573

†*Thornthwaite, C. W. and Holzman, Benjamin, **Measurement of evaporation from land and ater surfaces.** *U. S. Dept. of Agriculture, Technical Bulletin,* No. 817, **1942.** 143 p. 22 figs., 2 tables, 181 refs., 70 equations. **DLC**—Method for determining water losses to the atmosphere om land surfaces and from free water surfaces sought. Nature and previous methods of determin-ng evaporation reviewed. Importance of turbulence stressed in determination of rate of moisture ansfer from a natural surface into the atmosphere. Equation developed for determining this rate. nportance of wind velocity and humidity measurements emphasized, particularly in respect to this quation. Nearly complete hourly record of evaporation and condensation from a field at Arlington xperimental Farm, 1938–1939, kept, and values recorded. *Subject Headings:* **Evaporation, irginia.**

K–118 551.573:551.511

Holzman, Benjamin, **The influence of stability on evaporation.** (In **Boundary-layer problems the atmosphere and ocean,** by C. G. Rossby, New York, **1943.** p. 13–18. 13 refs., 17 equations.) **WB**—Relations between turbulence and stability of the atmosphere discussed. A formula for vaporation when conditions of stability prevail can be derived in a manner similar to that under diabatic conditions. Concluded that the influence of stability in suppressing evaporation cannot e of great importance. *Subject Headings:* **Evaporation, Turbulence, Instability.**

K–119 551.573(73)

*Horton, Robert E., **Evaporation-maps of the United States.** *American Geophysical Union, ransactions,* 24:743–753, **1943.** 4 figs., 4 tables, 11 refs., 3 equations. **DLC**—Pan evaporation cords for over 100 stations for from three to 25 years' duration along with information regarding ne stations are tabulated. Evaporation maps show inches per year and for different seasons. *ubject Headings:* **Evaporation, United States.**

K–120 551.573:551.5

Jacobs, Woodrow C., **Sources of atmospheric heat and moisture over the North Pacific an North Atlantic Oceans.** (In **Boundary-layer problems in the atmospheric and ocean,** by C. Rossby, New York, **1943.** p. 19-40.) **DWB**—A summary of results of an investigation concern with theoretical computations of mean seasonal evaporation and heat exchange over the North Paci and North Atlantic is presented; emphasis in Scripps Institution investigations is being placed upo the short period and nonperiodic variations in these quantities over the oceans. *Subject Heading* **Evaporation, Heat exchange, Sea surfaces, North Pacific Ocean, North Atlantic Ocean.**

K–121 551.573:551.58

†Martin, Emmett Virgil, **Studies of evaporation and transpiration under controlled condition** *Carnegie Institution of Washington, Publication,* No. 550, **1943.** 48 p. 17 figs., tables, 40 re **DWB**—Review of other work in field and methods of research. Data on experiments of transpirati rates from *Helianthus annuus* in darkness and from blotting paper evaporimeters, presented. Rel tion between these two phenomena discussed, and certain ecological applications of the concep involved indicated. *Subject Headings:* **Evaporation, Evapotranspiration, Ecology.**

K–122 551.5

Pasquill, F., **Evaporation from a plane, free-liquid surface into a turbulent air stream.** *Roy Society of London, Proceedings, A,* 182:75–95, Sept. **1943.** 5 figs., 7 tables, 29 refs., 16 equation **DLC**—Aerodynamics in the experimental study of evaporation emphasized. This treatmen concerned with evaporation from plane, free liquid surfaces of relatively small dimensions into tangential air stream, demonstrates the importance of the type of boundary layer flow. Rates evaporation under influence of a turbulent boundary layer are tested against a hydrodynami theory of O. G. Sutton. Suggested that the treatment constitutes an approach towards a co prehensive reduction of the problem, and also provides a means of calculating absolute magnitud in evaporation under certain prescribed circumstances. *Subject Headings:* **Evaporation, Turbule exchange.**

K–123 551.573:551.5

Stone, Robert G., **On the practical evaluation and interpretation of the cooling power in bi climatology.** *American Meteorological Society, Bulletin,* 24:295–305, Oct. **1943.** 2 figs., 7 equation **DWB**—Theoretical discussion of means of measuring and computing the cooling and evaporati powers of the atmosphere as applicable to bioclimatology. *Subject Headings:* **Evaporation, Bi climatology.**

K–124 551.573:551.5

Sverdrup, H. U., **On the ratio between heat conduction from the sea surface and heat used f evaporation.** *New York Academy of Sciences, Annals,* 44:81–88, **1943.** 13 refs., 13 equatio **DWB**—Energy equation discussed and a method of calculating evaporation using it develope *Subject Headings:* **Evaporation, Heat exchange.**

K–125 551.5

*U. S. War Dept., Mississippi River Commission, **Evaporation from lake and land pans. U. Waterways Experiment Station. (Jan. 1941 through Dec. 1942.)** Vicksburg, Miss., **1943.** 5 fig., 2 photos, 2 tables. **DWB**—Summation given of data resulting from investigation of evaporati from lake water surfaces, Jan. 1941 to Dec. 1942. The summary is in the form of monthly totals a averages, except for wind directions and weather conditions which are prevailing phenome *Subject Heading:* **Evaporation.**

K–126 551.578.4:551.573(79

Croft, Alfred Russell, **Evaporation from snow.** *American Meteorological Society, Bulleti* 25:334–337, Oct. **1944.** 2 figs., table. **DWB**—Results presented of preliminary study of evaporati from snow under three site conditions on a watershed of the Wasatch Plateau, Utah. Meth given. Figure shows evaporation from snow compared with vapor pressure of air and snow. *Su ject Headings:* **Evaporation of snow, Wasatch Plateau, Utah.**

K–127 551.573(74

Day, Richard Lorey, **Evaporation at Portland, Maine.** *American Meteorological Socie Bulletin,* 25:254–255, June **1944. DWB**—Brief report giving monthly normals for two years, 193 1939, of records of evaporation from a field pan. *Subject Headings:* **Evaporation, Portland, Mai**

K–128 551.573:551.578.1

Dolezel, Edward J., **Saturation and cooling of air layers by evaporation from falling rain.** *Journal of Meteorology*, 1:89–97, Dec. **1944.** 8 figs., table, 15 refs., 16 equations. **DWB**—Changes in temperature and relative humidity caused by evaporation from raindrops computed for cases involving three lapse rates and two rainfall intensities. Formulas for evaporation from stationary drops are modified to include effects of relative velocity and changing air temperature. Found that saturation due to evaporation alone will not be produced in an isothermal layer or a layer having a decrease of temperature with height. Inversions favor the formation of fog or low stratus due to evaporation alone. *Subject Headings:* **Evaporation, Raindrops.**—*From author's abstract.*

K–129 551.573(57)

Forsh, L. F., **Isparenie i kondensatsiia s poverkhnosti ozera Baĭkal.** [Evaporation and condensation from the surface of Lake Baikal.] *Akademiia Nauk, SSSR, Referaty, Nauchno-issledovatel'skikh Rabot*, **1944.** p. 145+. **DLC**—Results of the development of observations made by the Baikal limnological station presented. Maximum evaporation in Sept. and Oct. In winter 1 cm. of ice was observed to evaporate. In June, July and the first half of August no evaporation from the lake surface was noticed, only condensation. Stated that the formula of Shuleikin is valid also for calculation of evaporation from ice surface. *Subject Headings:* **Evaporation, Evaporation of ice, Lake Baikal, U.S.S.R.**

K–130 551.573:551.575

Ogiwara, S., **Studies on evaporation. Pt. 1. On the evaporation of water from a vessel of finite dimensions in the case of laminar boundary layer. Pts. 2–3. On the evaporation of fog and cloud particles.** *Meteorological Society of Japan, Journal*, 22:127–133, 134–142; 142–150, **1944.** In Japanese. (Unchecked.) Great Britain, Meteorological Office Library.—*Subject Headings:* **Evaporation, Fog, Clouds.**

1946

K–131 551.573

American Geophysical Union, **Committee on evaporation and transpiration, Report—1945–1946.** *American Geophysical Union, Transactions*, 27:720–725, **1946.** 6 figs. **DWB**—Progress report on evaporation investigations. Figures illustrate some of apparatus used. *Subject Headings:* **Evaporation, Evaporation instruments.**

K–132 551.573:551.524.4

Boelter, L. M. K., Gordon, H. S., and Griffin, J. R., **Free evaporation into air of water from a free horizontal quiet surface.** *Industrial and Engineering Chemistry, Industrial Edition*, 38:596–600, June **1946.** 9 figs., table, 13 refs., 13 equations. **DLC**—Supplements data of earlier work. (*See item* K-85) and allows wider extension of the analogy between thermal free convection and diffusional free convection. Generalized equations presented are used to predict rates of evaporation and cooling times of vessels of water and of alcohol into air at room temperatures under conditions of transient cooling. *Subject Headings:* **Evaporation, Heat exchange.**

K–133 551.573

†Budyko, M. I., **Metody opredeleniia estestvennogo isparenііa.** [Methods for determination of the natural evaporation.] *Meteorologiia i Gidrologiia, Informatsionnyĭ Sbornik*, No. 3, p. 4–15, **1946.** 31 refs., 24 equations. **MH-BH**—Study made of computation of natural evaporation from turbulent diffusion equations and heat balance equations. Author develops his own method. *Subject Headings:* **Evaporation, Turbulent diffusion, Heat balance.**

K–134 551.573:551.551

Cummings, N. W., **The reliability and usefulness of the energy equations for evaporation.** *American Geophysical Union, Transactions*, 27(1):81–94, **1946.** 2 tables, 15 refs., 13 equations. **DWB**—The derivation of the Bowen equation for the ratio of convective and evaporative heat transports is expressed in terms of modern turbulence theory. Objection to equation examined. Rational method of using turbulence theory without the aid of energy relations is suggested. Much evidence seen in favor of equation. *Subject Headings:* **Evaporation, Turbulent exchange.**

K–135 551.511:551.573

Frenkel, IAkov Il'ich, **Kinetic theory of liquids.** Oxford, Clarendon Press, **1946.** 488 p. 55 figs., 4 tables, refs., numerous equations. **DLC**—English edition of original Russian work, 1945. Emphasis on solid-liquid, rather than liquid-gas state usually treated in books on fluid dynamics. Evaporation is among the many problems which are treated in detail. Possible applications of this

theoretical work to studies on physics of clouds, evaporation, soil moisture, etc., are innumerab
More extensive abstract *see item* 9–52, *Meteorological Abstracts and Bibliography*, 1(9), Sept. 19
Subject Headings: **Evaporation, Fluid dynamics.**

K–136 551.573(4

Gygax, Fritz, **Über die Grösse der Verdunstung im Südtessin.** [On the amount of evaporat
in south Ticino.] *Schweizerische Naturforschende Gesellschaft, Verhandlungen*, 126:92–94, 19
table. **DLC**—Brief report of hydrological observations made from 1938 to 1944 in mountains
southwestern Switzerland, emphasizing evaporation components and the water loss for the distr
due to evaporation. *Subject Headings:* **Evaporation, Switzerland.**

K–137 551.573:551.52

Häfelin, J., **Der Wasseraustausch zwischen Luft und Schneeoberfläche im Hochgebir**
[Water exchange between air and snow surfaces in high mountains.] *Schweizerische Naturforschen
Gesellschaft, Verhandlungen*, 126:96–97, **1946.** **DLC**—Brief report of investigations conducted on t
Jungfraujoch in which measurements of the snow surface temperature and of the humidity a
temperature of the air were taken and used for evaporation determinations. *Subject Headin*
Evaporation of snow, Switzerland.

K–138 551.573:551.579.5(7

Hardy F., **Seasonal fluctuations of soil moisture and nitrate in a humid tropical climate.** (Tri
dad, B.W.I.) *Tropical Agriculture*, 23:40–49, **1946.** figs., 5 tables. **DLC**—Moisture and nitra
fluctuations in sandy soils of Trinidad considered. Chart shows percentages of runoff, evaporat
and water stored in soil for different seasons. Also: **The evaluation of soil moisture; results of t
application of some suggested methods for assessing "effective rainfall" to experimental da**
Ibid., p. 66–75, 1946. diagr., 4 tables, equation. **DLC**—Author discusses methods of evaluati
soil moisture from daily rainfall records. Chart shows comparison of available soil moisture direc
determined with effective rainfall calculated by Leake's formula. Runoff, evaporation, and wa
that soaks in considered. *Subject Headings:* **Evaporation, Precipitation, Soil moisture, Trinid
West Indies.**

K–139 551.5

Hickox, G. H. and others, **Evaporation from a free water surface.** *American Society of C
Engineers, Transactions*, 111:1–66, **1946.** 19 figs., 7 tables, 11 refs., 40 equations. **DLC**—Eva
oration pan experiments under controlled conditions described. Analogy drawn between h
transfer and mass transfer as they occur in evaporation; and evaporation rates are expressed
means of appropriate dimensionless groups. Results correlated and effects of variables discuss
suggestions made for further studies. *Subject Headings:* **Evaporation, Evaporation pans, H
exchange.**

K–140 551.573:551.57

Kirschmer, O. and Rimkus, K., **Losses due to evaporation and melting of the Alpine snow co
prior to spring thaw.** *FIAT Report* No. 1008, Ser. 4, **1946.** 10 p. (Unchecked.) Great Brita
Meteorological Office Library. *Subject Heading:* **Evaporation of snow.**

K–141 551.5

Makkaveev, V. M., **K voprosu o metodakh opredeleniia estestvennogo isphareniia.** [On t
problem of methods for determining natural evaporation.] *Meteorologiia i Gidrologiia, Inform
sionnyĭ Sbornik* No. 3, p. 16–18, **1946.** ref., 2 equations. **MH-BH**—Author gives some supp
mentary remarks on the article of Budyko, seeing no reason for rejection of Dalton formulas, wh
are frequently used by hydrologists and give good results if used with certain corrective coefficien
Subject Heading: **Evaporation.**

K–142 551.57

*Sverdrup, H. U., **The humidity gradient over the sea surface.** *Journal of Meteorology*, 3:1
March **1946.** 5 figs., 2 tables, 5 refs., 16 equations. **DWB**—Observations of temperature a
humidity at three levels above the sea surface are discussed, using data obtained at sea in 1937
wind velocities up to 16.5 m. sec.$^{-1}$. Shown that transfer of water vapor and momentum ob
similar laws. Great variability in humidity gradient indicated between heights of six and 30
and a relatively small variability in the difference between the vapor pressures at the surface a
six m. above the sea. *Subject Headings:* **Humidity distribution, Oceans.**

K–143 551.573:551.577

Thornthwaite, C. W., **The moisture-factor in climate.** *American Geophysical Union, Transactions*, 27:41–48, **1946.** 4 figs., table, 6 refs. **DLC**—Some data on precipitation and potential evapotranspiration presented for 16 stations in U. S. and tropical America. Pointed out that in evaluating moisture factor in climate, precipitation must be compared with the water needs or potential evapotranspiration. *Subject Headings:* **Precipitation, Evapotranspiration.**

K–144 551.573

Tschudin, Kurt, **Die Verdampfungsgeschwindigkeit von Eis.** [The speed of vaporization from ice.] *Helvetica Physica Acta*, 19:91–102, **1946.** 4 figs., 2 tables, 12 refs., equations. **DLC**—Rate of vaporization from ice measured by electric scales in a vacuum at different temperatures. *Subject Heading:* **Evaporation of ice.**

1947

K–145 551.573

Brookfield, K. J. and others, **The escape of molecules from a plane surface into a still atmosphere.** *Royal Society of London, Proceedings, A*, 190:59–67, **1947.** 3 figs., 6 tables, 9 refs., 26 equations. **DLC**—Highly theoretical work in which a theory is advanced embracing diffusion conditions formulated by Maxwell (1890) and vacuum conditions of Knudsen (1915), and cast in such form as to make accessible to experiment the determination of coefficients of diffusion and accommodation by novel means. Experimental determination of coefficient of diffusion of water vapor in air made. Reliable values of the coefficient of accommodation may be developed by this method. *Subject Headings:* **Evaporation, Turbulent diffusion.**

K–146 551.573

Jaw, Jeou-jang and Koo, Chen-chao, **A note on the equation for evaporation.** *Meteorological Magazine, Nanking*, 19:47–50, **1947.** table, 7 refs., equation. **DWB**—Authors say they have derived a more reasonable equation for evaporation "taking power law distribution of wind" and following Thornthwaite and Holzman. *Subject Heading:* **Evaporation.**

K–147 551.586:551.573

Miller, Erwin H., **Growth and environmental conditions in Southern California chaparral.** *American Midland Naturalist*, 37(2):379–420, **1947.** **DLC**—Air temperature, soil temperature, evaporation rates, soil moisture and growth of the more common shrubs measured from 1935 to 1938, at elevations of from 1500 to 5500 ft. Evaporation rates varied greatly. Slope exposure had more effect on rate than altitude. Other factors of growth noted. *Subject Headings:* **Bioclimatology, Evaporation, Phenology, Southern California.**

K–148 551.573.31

Sumner, E. J., **Diurnal variation of evaporation from natural surfaces.** *Meteorological Magazine, London*, 76:151–157, 175–179, **1947.** 3 figs., table, 15 refs., 6 equations. **DWB**—Author is concerned with diurnal variation of evaporation from a grass surface, and indicates a way of finding it based on energy considerations. Results put in diagrammatic form. Some analyses of factors involved given, and an attempt made to estimate probable error, although values arrived at agreed with those obtained elsewhere by other means. *Subject Heading:* **Evaporation.**

K–149 551.551:358 551.573:358

Sutton, O. G., **The problem of diffusion in the lower atmosphere.** *Royal Meteorological Society, Quarterly Journal*, 73:257–281, **1947.** fig., 3 tables, 9 refs., 26 equations. **DWB**—Account given of theory of atmospheric diffusion in connection with problems of chemical warfare. Also shown that observations on the rate of evaporation from very small areas are not necessarily a reliable indication of the rate of removal of vapor from large areas, such as lakes. *Subject Headings:* **Evaporation, Turbulent diffusion.**

K–150 551.573:551.577:551.58

Thornthwaite, C. W., **Climate and moisture conservation.** *Association of American Geographers, Annals*, 37:87–100, June **1947.** 5 figs., table, 16 refs. **DLC**—Relationships between rainfall and evapotranspiration stressed. *Subject Headings:* **Evapotranspiration, Precipitation, Climatology.**

K–151 551.573(794)

†*Young, Arthur Appleton, **Evaporation from water surfaces in California; a summary of pan records and coefficients 1881 to 1946.** *California, Dept. of Public Works, Division of Water Resources, Bulletin*, No. 54, **1947. Part I.** 68 p. 4 figs., 17 tables, 49 refs. *Bulletin 54-A*, 1948.

Part 2. 205 p. 353 tables. **DLC**—These two reports comprise much of the available data o subject. First part describes methods and apparatus used in recording evaporation, recommend tions for future investigations, and summary of the basic records which appear at length in Part I *Subject Headings:* **Evaporation, Evaporation data, California.**

K–152 551.57

*Young, Arthur A., **Some recent evaporation investigations.** *American Geophysical Unio Transactions*, 28:279–284, **1947.** fig., 4 tables, 4 refs. **DA**—Evaporation experiments in Southe California are described and some of data tabulated. Evaporation coefficients were determine Effects of color of pans and salt solutions on evaporation noted. Table gives mean monthly eva oration and reduction coefficients for Southern California. *Subject Headings:* **Evaporation, Southe California.**

1948

K–153 551.57

Abramovich, D. I., **Elementy rezhima rechnogo stoka v zavisimosti ot sootnosheniia tepla vlagi.** [Elements of river runoff depending upon the relation between heat and moisture.] *Pro lemy Fizicheskoĭ Geografii*, 13:110–121, **1948.** 2 tables, map, 10 refs., equations. **DLC**—The r lationship between evaporation and thickness of layer of snow or of water, from whose surfa evaporation is proceeding, is discussed; Voeikov's concept of "evaporability" is formulated as th evaporation of a layer of snow or water during a given time. The evaporating layer is calculated b the formula $E = 0.55 D_a^{0.8}(1 + 0.125W)$ in which E = evaporating layer of water in mm.; $D_a^{0.8}$ = atmo pheric moisture deficit in mm. at 2 meters above ground in shelter; W = wind velocity in mete found at height of wind vane. The ratio between evaporation from dry land, calculated by sub tracting drainage from precipitation, and "evaporability" is determined for European U.S.S.R isolines are drawn on a map. Three zones of evaporation are revealed: (1) zone where evaporatio from land is between 50 and 80 percent of evaporation calculated by preceding formula; (2) zone whe evaporation from land is less than 20 percent because of heat deficiency; and (3) that where evapor tion is less than 20 percent because of water deficiency. Each zone is characterized by specif hydrological, physical and chemical properties which are described. *Subject Headings:* **Evaporatio U.S.S.R.**—*I. L. D.*

K–154 551.57

Norris, Ramalingam, **Evaporation from extensive surfaces of water roughened by wave** *Royal Meteorological Society, Quarterly Journal*, 74:1–12, Jan. **1948.** 11 refs., 44 equations. **DWB**— Follows pattern of investigations of Sverdrup, Millar (1937), and Montgomery (1940). Work com pared; differences emphasized. Concluded that evaporation from a hydrodynamically rough surfac must be about four times as great as that expected from smooth surface of water. *Subject Headin* **Evaporation.**

K–155 551.57

Ogiwara, S., **On the evaporation of water from a vessel of finite dimensions in the case o laminar boundary layer—(Supplementary report).** *Meteorological Society of Japan, Journa* 26(9–12):232–234, Sept.–Dec. **1948.** 3 refs., 8 equations. In Japanese. English abstract p. 2 **DLC**—The velocity distribution in the boundary layer, calculated from the momentum equation o boundary layer, is applied to the diffusion equation of water vapor to obtain a formula for rate o evaporation of water. *Subject Headings:* **Evaporation, Turbulent diffusion.**

K–156 551.57

†Penman, H. L., **Natural evaporation from open water, bare soil and grass.** *Royal Society o London, Proceedings, A*, 193:120–145, **1948.** 6 figs., 13 tables, 22 refs., 20 equations. **DLC**—Tw theoretical approaches to evaporation from saturated surfaces are outlined, the first being on a aerodynamic basis in which evaporation is regarded as due to turbulent transport of vapor by process of eddy diffusion and the second being on an energy basis in which evaporation is regarde as one of the ways of degrading incoming radiation. A combination of these is suggested, thus elim nating surface temperature parameter and providing an opportunity to make theoretical estimates o evaporation rates from standard meteorological data. Experimental work reviewed. *Subje Headings:* **Evaporation, Turbulent diffusion.**

K–157 551.57

Penner, S. S., **The maximum possible rate of evaporation of liquids.** *Journal of Physical an Colloidal Chemistry*, 52:367–373, **1948.** 2 tables, 12 refs., 15 equations. **DLC**—Equation formulate

r maximum possible rate of isothermal vaporization of liquids. By using new theory of maximum aporation rate an independent determination of the free volume of a liquid is permitted. *Subject eading:* **Evaporation.**

K–158 551.573

Simojoki, Heikki, **On the evaporation from the northern Baltic.** *Geophysica, Helsinki*, 3:123–6, **1948.** table, 7 refs., 7 equations. **MH-BH**—Jacobs' modification of Sverdrup's formula for aporation of water from the sea used. Maximum evaporation noted in autumn; minimum in early mmer. Mean annual evaporation calculated. *Subject Headings:* **Evaporation, Baltic Sea.**

K–159 551.573:551.579(471.1)

Sirén, Allan, **Die Bestimmung der Verdunstung und ihrer Einwirkung auf die Wasserläufen** *ic)* **von Finnland.** [Determination of evaporation and its influence upon the waterways of Finland.] *ophysica, Helsinki*, 3:162–172, **1948.** 6 figs., 2 tables, 10 refs., 4 equations. **MH-BH**—Thirty-ar mean of precipitation and evaporation calculated for Finland. Map shows distribution for 11–1940. Concluded that evaporation from land is independent of size of precipitation area, that relationship exists between evaporation and percentage of lakes, and that precipitation slightly creases evaporation. Method for determining monthly course of evaporation and empirical uation for calculating monthly evaporation in summer presented. (*See item* 11–122). *Subject eadings:* **Evaporation, Hydrology, Finland.**—*I.L.D.*

K–160 551.573:551.58

Thornthwaite, C. W., **An approach toward a rational classification of climate.** *Geographical eview*, 38:55–94, **1948.** 13 figs., map, 5 tables, refs. **DLC**—Potential evapotranspiration is nsidered as an important factor of climate. *Subject Headings:* **Evapotranspiration, Climatology.**

K–161 551.573

Tsuji, M., **On the rate of evaporation of small water drops.** *Meteorological Society of Japan, ournal, 2nd Ser., Special Report*, p. 40–45, **1948.** 4 figs., table, 4 refs., 18 equations. (In Japanese.) nglish abstract p. [88–89]. **DLC**—Theoretical discussion of Ogiwara's formula for rate of evap-ation of a water drop with a radius less than 60μ. Also: **On the rate of evaporation from the plane rface of water in the case of laminar boundary layer.** *Ibid.*, p. 71–73. 4 refs., 21 equations. (In apanese.) English abstract p. [92]. **DLC**—Theoretical discussion of formulas of rate of evapora-on from water surface and of diffusion of water vapor in space. *Subject Headings:* **Evaporation, urbulent diffusion.**

K–162 551.579:551.573

†Velikanov, M. A., **Gidrologiia sushi.** 4th ed. [Land of Hydrology.] Leningrad, ioromet. Izdat., **1948.** 530 p., numerous figs., tables, refs., equations. **DLC**—An extensive work n which problems of evaporation from soil and from water surfaces are considered among numerous ther topics. For more extensive abstract, *see item* 8–104. *Meteorological Abstracts and Bibliog-aphy*, 1(8), Aug. 1950. *Subject Headings:* **Hydrology, Evaporation.**

K–163 551.573:551.521.1(611)

*Viguier, Louis, **Actinométrie, insolation, évaporation; période 1927–1948.** [Actinometry, nsolation, evaporation; period 1927–1948.] *Service Météorologique, Tunis.* **1948.** 12 leaves. 12 ables. **MH-BH**—Summary of observations made at Tunis over 22 years. Includes monthly, otal, maximum, minimum and mean values of solar radiation, of insolation, and of evaporation made vith a Piché evaporimeter. *Subject Headings:* **Insolation, Evaporation, Actinometry, Tunis.**

1949

K–164 551.52:551.573

†Albrecht, Fritz, **Über die Wärme- und Wasserbilanz der Erde.** [On the heat and water alance of the earth.] *Annalen der Meteorologie*, 2(5–6):129–143, May–June **1949.** 16 figs., 19 efs. Summary in English p. 129. **DWB**—For the Indian and Pacific Oceans author calculates, mong other energy values, total evaporation and precipitation for Feb., May, Aug., and Nov. For nore extensive abstract *see item* 4–71, *Meteorological Abstracts and Bibliography*, 1(4), April 1950. *ubject Headings:* **Evaporation, Heat balance, Indian Ocean, Pacific Ocean.**

K–165 551.573

Berkes, Zoltán, **Szabad vizfelületek és a talaj párolgásának viszonya.** [Evaporation from water nd soil surfaces.] *Időjárás*, 53:363–366, Nov.–Dec. **1949.** 2 figs. Summary in French p. 405–406.

DWB—Wild's evaporimeter described as giving data for evaporation from free water surface, b not for soil or vegetation covered surfaces. More complete evaporation measurement sought t use in determinations of the hydrologic cycle. Wild's evaporation data for the Carpathian regi for 1929–1943 are examined and additional consideration suggested to allow for the effects of veget tive covering. *Subject Headings:* **Evaporation, Evaporimeters, Hydrologic cycle, Carpathian regic**

K–166 551.573:551.5

†*Calder, K. L., **Eddy diffusion and evaporation in flow over aerodynamically smooth and rou surfaces: a treatment based on laboratory laws of turbulent flow with special reference to conditio in the lower atmosphere.** *Quarterly Journal of Mechanics and Applied Mathematics*, 2:153–176, 194 8 tables, 22 refs., 48 equations. **DLC**—A theoretical treatment of the problems of eddy diffusion an evaporation is developed, based on the use of well-established laboratory data for the laws of tu bulent flow. Formulas developed may also be applied to the transfer of heat from aerodynamicall smooth and rough surfaces provided the temperature differences are not too large. *Subject Heading* **Evaporation, Eddy diffusion, Turbulent exchange.**

K–167 551.573:551.511:551.5

†*Craig, Richard A., **Vertical eddy transfer of heat and water vapor in stable air.** *Journal Meteorology*, 6:123–133, **1949.** 5 figs., 3 tables, 27 refs., 23 equations. **MH-BH**—Construction vertical cross sections showing the air's over-water modification made possible by low level aircra soundings at successive distances offshore in winds from land, being limited to soundings for whi the unmodified air was warmer than the water and homogeneous in the lowest 1000 ft. The cro sections are used to determine values of the relative evaporation $E/(q_0 - q_i)$, where E is rate of eva oration per unit horizontal area, q_0 is specific humidity at the air-water interface, and q_i is speci humidity of the initial, unmodified air. Also: Craig, Richard A. and Montgomery, R. B., **Evap ration (measured) from ocean into hydrostatically stable air.** *Ibid.*, p. 426–427. table, ref. F the soundings reported above the authors here supply values of the humidity deficit and of t resulting unit area of evaporation. *Subject Headings:* **Evaporation, Eddy diffusion, Humidity di tribution.**

K–168 551.573(43

Dub, Oto, **Výpar, jeho plošné a časové rozdelenie na Slovensku.** [Evaporation, its space an time distribution in Slovakia..] *Meteorologické Zpravy*, 3(2):23–27, **1949.** 8 figs., 5 tables, 4 ref equations. **DWB**—Map of Czechoslovakia shows evaporation areas. *Subject Headings:* **Eva oration, Czechoslovakia.**

K–169 551.57

Göhre, K., **Beitrag zur Verdunstung zu verschiedenen Tageszeiten und bei verschiedene Witterungseinflüssen.** [Contribution to evaporation at different times of day and under differen weather influences.] *Zeitschrift für Meteorologie*, 3(10):289–293, Oct. **1949.** 5 tables. **DLC**— Tables give monthly values of evaporation at Eberswalde from bare soil, meadow and pine woo Means are given for groups of days with different cloud, rain and wind conditions. Greatest eva oration occurs with small cloud and strong wind. Owing to transpiration, loss from meadow an pine wood is several times that from bare ground. *Subject Headings:* **Evaporation, Evapotranspira tion, Germany.**

K–170 551.573:551.579(0

†*Hydrology Committee of the Hydraulics Division, American Society of Civil Engineers, **Hy drology handbook.** Manuals of engineering practice, No. 28. New York, **1949.** 184 p. 68 figs 17 tables, 231 refs. equations. **DWB**—Principles and applications of hydrology for practicin engineers are presented, stressing basic principles needed for planning flood control and water suppl projects and for designing of land drainage and storm sewers. The five chapters are entitled precipitation, infiltration, runoff, evaporation and transpiration, and ground water storage. Bibli ography appended for each chapter. *Subject Headings:* **Hydrology, Evaporation, Precipitation Runoff, Infiltration, Soil moisture.**

K–171 551.573:551.579.

Ioganson, V. E., **O vlagooborote i vodnom balanse na ravninnoĭ chasti evropeiskoĭ territor Soiuza.** [Water vapor circulation and water balance over the plains of European U.S.S.R. *Akademiia Nauk, SSSR, Izvestiia, Ser. Geogr. i Geofiz.*, 13:273–280, **1949.** map, 15 refs. **DLC**— Author gives approximate data for the water balance for the European parts of U.S.S.R. *Subje Headings:* **Evaporation, Western U.S.S.R.**

K–172 551.573:551.575

Ogiwara, S., **Experimental studies on the evaporation of fog particles.** (Studies of evaporation. Part VI). *Meteorological Society of Japan, Journal*, 27:10–15, Jan. **1949.** 2 figs., table, 5 refs., 3 equations. In Japanese. English abstract p. 4. **DLC**—By theoretical calculations author obtains formula for rate of evaporation of fog particles, which he verifies experimentally. *Subject Headings:* **Evaporation, Fog.**

K–173 551.551:551.573

Pasquill, F., **Eddy diffusion of water vapour and heat near the ground.** *Royal Society of London, Proceedings, A*, 198:116–140, July 22, **1949.** 5 figs., 5 tables, 25 refs., 22 equations. **DLC**—Experimental study made of turbulent transport of water vapor and heat in low atmosphere over exposed level grassland and of the validity of formulas prescribing natural evaporation in terms of meteorological factors. Observations of water loss from soil surface taken along with observations of solar radiation, temperature distribution in soil, vertical profiles of temperature, humidity and wind speed in air. Theoretical evaluations made of heat exchange components and of magnitudes of the eddy diffusivity for heat, and concepts applied to the indirect evaluation of natural evaporation. *Subject Headings:* **Evaporation, Water vapor, Heat exchange, Eddy diffusion.**

K–174 551.573

Pasquill, F., **Some estimates of the amount and diurnal variation of evaporation from a clayland pasture in fair spring weather.** *Royal Meteorological Society, Quarterly Journal*, 75:249–256, July **1949.** fig., table, 7 refs., 8 equations. **DLC**—A simplified form of the theoretical equation for evaporation in adiabatic conditions (used by Thornthwaite and Holzman) is employed as a justifiable approximation, in terms of near-surface observations of the vertical distribution of wind velocity and vapor pressure, in evaluating rates of evaporation at hourly intervals over a clay land pasture during a week of fair spring weather. Pronounced diurnal variation shown. *Subject Heading:* **Evaporation.**

K–175 551.573:551.586:631.4

Priestley, C. H. B., **Meteorological aspects of soil and crop evaporation.** British Commonwealth Scientific Official Conference in Agriculture, Melbourne, Ser. A, 4°, **1949.** 11 p. Great Britain, Meteorological Office Library—Evaporation from soil depends on rate of supply and rate at which vapour can diffuse away. Use of tanks criticized; other methods discussed are inferential aerodynamics based on wind and humidity profiles, soil humidity profiles or integrated weighing, and measurement of upward flux of vapor in air near surface. Recent climatic studies summarized. *Subject Headings:* **Evaporation, Bioclimatology.**—*C.E.P.B.*

K–176 551.573:551.574.1

Rodebush, W. H., **Nuclei in evaporation and condensation.** *Chemical Reviews*, 44:269–276, April **1949.** 3 figs., 6 refs., equation. **DLC**—Discussion of nonpolar gases in water solution. Stated that nuclei of evaporation and condensation become bubbles or drops. Supersaturation of vapors in the absence of nuclei is treated. *Subject Headings:* **Evaporation, Condensation nuclei.**

K–177 551.573 551.577.2

†*Simojoki, Heikki, **Niederschlag und Verdunstung auf dem Baltischen Meer.** [Precipitation and evaporation in the Baltic Sea.] *Helsinki University, Institute of Meteorology, Papers* No. 64, **1949.** 25 p. 5 figs., 2+tables, 18 refs., 2 equations. Summary in English p. 22. (Reprint from *Fennia*, 71.) **MH-BH**—Precipitation records for 78 places along the coast and on islands in the Baltic, are reduced to the period 1886–1935, and isohyetal charts prepared therefrom. The variations from sea to land and from month to month are analyzed and discussed in connection with the dynamic processes involved. Special consideration is given to the problem of evaporation over the Baltic, and to convective showers in the summer. *Subject Headings:* **Precipitation, Evaporation, Baltic Sea.**—*M.R.*

K–178 551.573:551.585.9

Stenz, E., **The problem of arid climates from the standpoint of evaporation.** *Studia Soc. Scient. Torunesis, A*, 1(7), **1949.** 69 p. (Unchecked in original.) Abstract by W. Mörikofer in *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, 2(1–2):144–145, 1950. equations. **MH-BH**—On the basis of evaporation studies from 1939–1948 in Afghanistan author derives a formula for dry climates. Evaporation discussed in relation to other climatic factors. New formula for monthly evaporation measurement also developed. *Subject Headings:* **Evaporation, Climatology, Afghanistan.**

K–179 551.573:551.574.7

Vasseur, M., **Dégivrage par évaporation totale sur zone étendue.** [De-icing by total evaporation from an extended area.] *La Recherche Aéronautique, Paris*, No. 12:59–63, **1949.** 2 figs., 8

tables, 2 equations. **DLC**—Temperature conditions and amount of heat needed for evaporatic under specified conditions are discussed and curves plotted. *Subject Headings:* **Evaporation, Icing**

K–180 551.578.46:551.5

Wundt, Walter, **Über das Schwinden von Schneeflächen.** [On the disappearance of sno surfaces.] *Wetter und Klima*, 2(5–6):161–167, May–June **1949.** table. **DWB**—From observation on St. Moritz Lake in Jan. 1943, author concludes that at temperatures below 0°C. snow surfac lose ca. 1/2 mm. day by evaporation; above 0°C., by melting. Saturation deficit is less importan *Subject Headings:* **Evaporation of snow, Switzerland.**—*C.E.P.B.*

K–181 551.57

Wyllie, G., **Evaporation and surface structure of liquids.** *Royal Society of London, Proceeding A*, 197:383–395, June 22, **1949.** 2 figs., table, 22 refs., equations. **DLC**—The condensation coeff cient of a liquid is defined as the ratio of the observed rate of evaporation under given conditions t the "expected" rate calculated from known saturation vapor pressure, for the same condition Theory of evaporation discussed on a model of the liquid surface consisting of a compact ordere layer with a mobile adsorbed layer of molecules above it. *Subject Heading:* **Evaporation.**

K–182 551.57

Yamamoto, G. and Miura, A., **On the rate of evaporation of small water drops.** *Meteorologica Society of Japan, Journal, 2nd Ser.*, 27:257–260, **1949.** 2 figs., 4 tables, 11 refs., 3 equations. I Japanese. English abstract p. 31. **DWB**—Rate of evaporation of water drops with radii less tha 25μ studied. Results agreed approximately with theory of Tsuji.

Yamamoto, G., **Some experiments on evaporation from finite surfaces.** *Ibid.*, p. 318–331 9 figs., 11 refs., 4 equations. In Japanese. English abstract p. 36. **DWB**—Wind tunnel experi ments on evaporation reported. Formulas for mean rate of evaporation computed for laminar an turbulent boundary layers on the surface of water.

Evaporation by natural convection. *Ibid.*, p. 342–345. 3 figs., 5 refs., 12 equations. I Japanese. English abstract p. 37. **DWB**—From the analogy between heat transfer and evapora tion, the rate of evaporation from a finite pan by natural convection is obtained and reported This article published in English *see item* K–204. *Subject Headings:* **Evaporation, Turbulent diffu sion, Heat exchange.**

1950

K–183 551.573:551.508.72

†*Albrecht, F., **Die Methoden zur Bestimmung der Verdunstung der natürlichen Erdoberfläche.** [Methods for determination of evaporation from the natural land surface.] *Archiv für Meteorologic Geophysik und Bioklimatologie, Ser. B*, 2(1–2):1–38, **1950.** 14 figs., 6 tables, 31 refs., 20 equations. **DWB, MH–BH**—In order to determine evaporation from a soil surface covered with vegetation four measurement procedures are considered: 1) measurement of the heat economy by determining air temperature and air humidity at two different levels, soil temperature and radiation exchange; 2) determination of evaporation from measurements of vapor pressure gradient and *austausch*; 3) determination of cooperation from surface humidity and temperature in combination with coeffi cients of external heat conduction; 4) determination of evaporation from water balance of soil. *Subject Headings:* **Evaporation, Land surfaces, Climatology.**—*I. L. D.*

K–184 551.573:551.508.7

†Anderson, E. R., Anderson. L. J., and Marciano, J. J., **A review of evaporation theory and development of instrumentation.** *U. S. Navy Electronics Laboratory, San Diego, California, NE 121215, Report 159, Problem 2J1a*, Feb. 1, **1950.** 71 p. 20 figs., 77 refs., 171 equations.—Report reviews many evaporation equations based on mass transfer and energy budget approaches. Eleven chosen (four based on the "continuous mixing" concept, four on "mixing length" approach, two on a modification of these, and one on the energy budget), to be tested at a "pilot" lake (Lake Hefner, Oklahoma) where the evaporation can be independently determined from an accurate water budget. Standard instruments have been modified and new instruments developed to measure the pertinent meteorologic and hydrologic parameters. *Subject Headings:* **Evaporation, Evaporation instruments, Energy exchange.**

K–185 551.573:551.579

Benton, George S., Blackburn, Robert T., and Snead, Vernon O., **The role of the atmosphere in the hydrologic cycle.** *American Geophysical Union, Transactions*, 31(1):61–73, Feb. **1950.** 6 figs., 4 tables, 11 refs., 4 equations. **DWB**—From pilot balloon and radiosonde data for North America, a quantitative estimate of moisture advection in different air masses is derived and applied to the classical or qualitative Hydrologic Cycle scheme for the Mississippi Basin. Precipitation, runoff, evapotranspiration (according to air mass and season), and moisture transport into the Basin are discussed in detail and quantitative data shown in tables and charts. The conclusion is that only a small amount (20%) of the moisture in maritime air flowing over the Mississippi Basin is precipitated.

ontinental air masses pick up an additional 25% of moisture, but serve as sources for only a small oportion of the rainfall. Hence any modification of the evapotranspiration surfaces would have tle effect on total precipitation. *Subject Headings:* **Hydrologic cycle, Evapotranspiration, Air asses, Mississippi Basin.**—*M.R.*

K–186 551.573

Chebotarev, N. P., **Isparenie s poverkhnosti pochvy pri urovne gruntovykh vod nizhe poverhnosti.** [Evaporation from the surface of the soil when the water level is below the surface.] *Akademiia Nauk, SSSR, Doklady*, 71(2):275–276, March 11, **1950.** 2 refs., 7 equations. **DLC**—heoretical solution of the problem of diffusion of water vapor from the ground water level to the rth's surface. The formula gives the amount of evaporation in terms of size of soil particles. ne first experimental results with sand indicate that maximum evaporation occurs when particles e between 0.35 and 0.50 mm. in diameter. *Subject Headings:* **Evaporation, Soil moisture.**—*M.R.*

K–187 551.573:551.511

Davies, D. R., **Three-dimensional turbulence and evaporation in the lower atmosphere. I, II.** *uarterly Journal of Mechanics and Applied Mathematics*, 3(1):51–73, March **1950.** table, 80 uations. **DLC**—The investigation extends O. G. Sutton's theory of evaporation in a turbulent r stream from a plane saturated liquid surface to a finite rectangular lake, introducing lateral ffusivity. In Part I a mathematical solution is obtained which is applicable to any evaporating ea. In Part II a power law of variation of diffusivity with height, incorporating the lateral effect, determined by theory in the form $K_y = a_y U_1^{1-n_z\alpha}$ where α, n are determinable constants for a given rbulent state, and a_y depends on α. This is applied to evaporation from a finite area and good reement is obtained with observations, but a complete solution is not yet practicable. *Subject eadings:* **Turbulence, Evaporation.**—*C.E.P.B.*

K–188 551.511 551.551:551.573

Davies, D. R., **A note on three-dimensional turbulence and evaporation in the lower atmosphere.** *oyal Society of London, Proceedings, Ser. A*, 202(1068):96–103, June 22, **1950.** 2 tables, 8 refs., 4 uations. **DLC**—Calder (1949) worked out the theory for vertical distribution of vapor down wind om a short grass plane surface which is uniformly wetted. He allowed for aerodynamic roughness, it assumed adiabatic conditions. Deacon (1949) extended this theory to cover nonadiabatic nditions, and Sutton (1949) applied his statistical theory to cover three-dimensional diffusion om a continuous point source. The author now applies his earlier (1947) three-dimensional model turbulence to the above problem, to determine the vertical distribution of vapor at the down-wind ge of a parabolic area and incidentally to determine the evaporation from a finite area. He gets od agreement between theory and observation for points above or not too far removed from the ea in question. Finally, the formal connection between the two- and the three-dimensional eories is shown mathematically, and the results of measurements are compared with calculations r 1, 8, 24, and 48 inches above and 0, 2.5 and 5.0 yards from the axis of an area 10 yards across. *ubject Headings:* **Turbulence, Evaporation.**—*M.R.*

K–189 551.511:551.571.7

Faust, Heinrich, **"Verdunstungslabilität"—ein neues Mass der atmosphärischen Labilität.** ["Evaporation instability"—a new measure of atmospheric instability.] *Zeitschrift für Meteorologie*, 4–5):97–102, April–May **1950.** 5 figs., 8 tables, 8 refs. **DLC**—Present methods of measuring bility are unsatisfactory because cloud formation depends on relative humidity in free air. Cloud rticles rising into dry air are evaporated; after reaching saturation level rising air follows a curve tween dry and wet adiabatics. Author plotted occurrence or nonoccurrence of thunder on 300 ys against thermal lability and upper air humidity and found that sloping boundary lines could be awn. *Subject Headings:* **Evaporation, Instability, Upper air humidity, Thunderstorms.**—*C.E.P.B.*

K–190 551.573:551.571.4

Frankenberger, Ernst, **Über das vertikale Gefälle der Luftfeuchtigkeit und die Verdunstung i Quickborn/Holst.** [On the vertical gradient of humidity and evaporation at Quickborn/Holstein.] *Deutscher Wetterdienst in der U. S. Zone, Berichte*, No. 12, p. 45–51, **1950.** 4 figs., table, f., equations. **MH-BH**—Specific humidity measured hourly at 2,.13, 28 and 70 m. height on 29 ys, using electrically ventilated instruments. These gave the *austausch* coefficients at various ights and temperatures. The ratio 1.4:1 between vertical coefficients for heat and humidity, and r momentum, was confirmed. Evaporation was calculated from humidity gradient and *austausch* efficient for rain days and days with wet and dry ground. *Subject Headings:* **Humidity distribution, aporation, Germany.**—*C.E.P.B.*

K–191 551.573:551.577.3:551.579.1

Glasspoole, John, **Rainfall, run-off, and evaporation.** Paper read at the Public Works and unicipal Services Congress, England, 16th Nov. **1950.** 22 p. 8 figs., 2 tables.—Sets out work of

bodies dealing with various parts of hydrologic cycle in Britain. Under rainfall are considered annu values and trends 1727–1949, seasonal sequences and frequencies. Runoff of Thames Valley is di cussed from daily values and annual totals. The next section describes recent work on evaporatic based on evaporation tanks, percolation gages, well levels, gages of springs and runoff; a generalize map of rainfall minus runoff is given. Suggestions are made for meeting increasing demand f water supply. *Subject Headings:* **Hydrologic cycle, Evaporation, Precipitation, Runoff, Great Britai** —*C.E.P.B.*

K–192 551.579:551.573:551.

Jacobs, Woodrow C., **The distribution and some effects of the seasonal quantities of E– (evaporation minus precipitation) over the North Atlantic and North Pacific.** *Archiv für Meteo ologie, Geophysik und Bioklimatologie, Ser. A*, 2(1):1–16, **1950.** 6 figs., 2 tables, 10 refs., equatio **DWB**—Charts of the sum total of seasonal evaporation minus precipitation, for the Norther Hemisphere oceans, compiled on the basis of previously computed seasonal evaporation and pr cipitation, are presented. The computations show that: (1) in spite of greater area, the Nort Pacific actually contributes less moisture for precipitation over land than does the North Atlanti and (2) in summer the Northern Hemisphere oceans are not sources of moisture for precipitatic over land, leading to the assumptions that in summer: (1) moisture is carried into the Norther Hemisphere from the Southern, and (2) considerable moisture precipitated over the land and ocea must come from the continents. Quantitative data are given for different areas and seasons both terms of totals of *E*, *P*, and *E-P*, and in terms of cm. of excess or deficiency at a point or over a area. Salinity balance shown graphically. Assumed that the Arctic Ocean balances the Medite ranean; and the Indian Ocean, the Red Sea, in respect to *E-P* over the Northern Hemispher *Subject Headings:* **Hydrologic cycle, Evaporation, Precipitation, Salinity, Oceans, North Atlant Ocean, North Pacific Ocean, Northern Hemisphere.**—*M.R.*

K–193 551.573 536.

Johnson, John C., **Measurement of the surface temperature of evaporating water drops.** *Jou nal of Applied Physics*, 21:22–23, **1950.** 3 figs., table, 4 refs., 7 equations. **DLC**—Measuremen made of surface temperature of evaporating drops are in agreement with the requirement of th theory of Fuchs, stating that the temperature is determined by the difference between the ambien and saturated vapor density of the drop. *Subject Heading:* **Evaporation.**

K–194 551.573:551.5

Pasquill, F., **Meteorological Office discussion. [The turbulent exchange of water vapour, he and momentum near the ground.]** *Meteorological Magazine, London*, 79(933):81–85, March 195 5 refs. **DWB**—Discussion at the Imperial College, Jan. 9, 1950, on the problem of turbulent e change of water vapor, heat and momentum near the ground. Description of observational wor carried out at Cambridge during the past three years, given. *Subject Headings:* **Turbulent exchang Heat exchange, Evaporation.**

K–195 551.573:551.584:551.5

***Micrometeorology of the surface layer of the atmosphere.** C. W. Thornthwaite, Com *Johns Hopkins University, Laboratory of Climatology, Seabrook, New Jersey. Interim Reports*, No 4–10, **1948–1950.** numerous figs. and tables. **MH-BH**—The study involves detailed, simultaneo and accurate measurements of the properties of the air near the ground, including: temperatu gradients and fluctuations; wind gradients and fluctuations and wind shear; moisture concentratio and humidity gradients; turbulence, evaporation and transpiration; and radiation and insolatio Improvement of instrumentation is included along with a great deal of data. *Subject Heading* **Micrometeorology, Evaporation, Turbulence, Radiation, Instruments, Evapotranspiration.**

K–196 551.5

Pasquill, F., **Some further considerations of the measurement and indirect evaluation of natur evaporation.** *Royal Meteorological Society, Quarterly Journal*, 76:287–301, July **1950.** 2 figs., tables, 6 refs., 7 equations. **MH-BH**—Sets out results of further measurements of evaporatio from the soil and associated vertical profiles of wind velocity and vapor pressure 0–2 meters. Th site was clayland pasture; conditions mainly adiabatic. The observed rates of evaporation are co pared with those calculated from an expression involving wind velocity and specific humidity at tw heights above effective zero. The agreement was good. Possible application to evaporation fro crops is discussed. *Subject Headings:* **Evaporation, Evapotranspiration.**

K–197 551.573(41)(4

Penman, H. L., **Evaporation over the British Isles.** *Royal Meteorological Society, Quarter Journal*, 76:372–383, Oct. **1950.** fig., 2 tables, **DWB**—Estimates of monthly evaporation from a extensive water surface are made for 25 places and annual evaporation at 102 places, by an equatio

volving sunshine, temperature, saturation deficit and wind speed. To convert to evapotranspira-
on from a green surface never short of water (nearly true of British Is.) an empirical factor of 0.6–
3 (year 0.75) is used. Annual values are checked by measurements of rainfall minus runoff in
catchment areas and agree. The annual evaporation is charted; it varies from 14 in. in Scotland
20 in. on south coast. Sources of error and applications to irrigation are discussed. *Subject*
eadings: **Evaporation, Great Britain.**

K–198 551.573(712)

*Sanderson, Marie, **Measuring potential evapotranspiration at Norman Wells, 1949.** *Geo-
aphical Review*, 40(4):636–645, Oct. **1950.** 7 figs., 2 tables, 10 refs. **DLC**—Equipment used at
orman Wells, Northwest Territories, (lat. 65°N), described and illustrated. Daily readings made
ly 2 to Sept. 1, 1949, at two sites given in detail: temperature, precipitation, overflow, intake, and
easured and computed evapotranspiration; graphs illustrate. *Subject Headings:* **Evapotranspira-
n, Norman Wells, Canada, Arctic.**—*M.R.*

K–199 551.579:551.573(52)

Sekiguchi, T., **Climatological water balance problem in Japan.** *Geophysical Magazine, Tokyo*,
(2):177–189, March **1950.** 15 figs., 4 tables, 2 refs. **MH-BH**—The climate of Japan is analyzed
means of C. W. Thornthwaite's concept of potential evapotranspiration. A comparison is made
tween potential evapotranspiration values and actual values obtained with an atmometer. Maps
ustrate the geographical distribution of annual and monthly potential evapotranspiration, of water
rplus and deficit regions and of amounts of water storage change, and the geographical distribution
annual moisture ratio. The distribution of water surplus and deficit areas corresponds very
osely to regions characterized by wetness and drought respectively. *Subject Headings:* **Evapo-
nspiration, Hydrologic cycle, Climatic classification, Japan.**—*I.L.D.*

K–200 551.573:551.579:551.582

Thornthwaite, C. W., **Notes on tropical climatology.** Prepared for presentation at the Carib-
an Soils Conference, San Juan, Puerto Rico, April **1950.** 8 p. 16 figs., 10 refs. (Mimeographed.)
H-BH—Importance of moisture as an element of variation in tropical climatology is stressed.
ydrologic balance of climate must be investigated, in which evaporation and evapotranspiration
ay a major role. Aspects of this problem in such regions as the Congo Basin and Puerto Rico
e discussed and references given to more detailed data sources. *Subject Headings:* **Evaporation,
apotranspiration, Tropical climatology, Belgian Congo, Puerto Rico.**

K–201 551.573

Tsuji, M., **On the rate of evaporation of water drops.** *Meteorological Society of Japan, Journal*,
d Ser., 28(4):121–128, April **1950.** 3 figs., 15 refs., 11 equations. Abstract in English. **MH-BH**
A semi-empirical formula nearly the same as Frössling's is derived for the rate of evaporation of
ater drops. *Subject Heading:* **Evaporation.**

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$=1+k(Re)^n$ where Re is the Reynold's number and k and n are quantities varying slowly with
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